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Xoma Drops 2 Suits, In Financial Trouble

By Toni Wiseman
Of the CW Staff

MONTREAL — Xoma Ltd. has dropped its patent infringement suits against IBM Canada and McGill University, but the status of a similar suit against Systems Dimension Ltd. remains in doubt.

The discontinued suits followed in the wake of Xoma's progressive financial difficulties, culminating in the collapse of a proposed merger with Delstar Ltd.

The three suits were filed on the basis of a patent issued to Xoma for an accounting system which separates data into individual transactions, classifies and stores acceptable items and rejects those which do not meet predefined standards [CW, Jan. 24].

The defendants alleged the suit was without merit because the programming techniques had been in use for several years prior to the date of the patent filing.

No reason was given for dropping the IBM and McGill suits. An IBM legal spokesman said, "Their counsel simply told [us] it was being dropped."

The suit against SDL, however, remains in question.

Robert M. Barrigar, Xoma's patent attorney, stated, "As far as I know, I'm continuing to represent Xoma in its patent matters and in its law suit against SDL."

"I have had no instruction to drop the suit," he said.

However, when SDL went to court late last May asking for a motion to speed up the case, Xoma's lawyer did not appear in court, according to SDL Vice-President Norm Williams. Instead, he sent a letter saying "his client was insolvent and that it was unlikely he would be proceeding any further in the case," Williams said.

The letter recommended that the court postpone any action on the matter until the fall when the client might have some financing, Williams added.

According to Barrigar, when the motion was originally heard, the associate chief justice became ill and was unable to make

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Training Program Finds Strength in Tradition

By Edith Holmes
Of the CW Staff

SYRACUSE, N.Y. — What's new isn't always what's best.

At Mutual of New York (Mony) here, entry-level programmers receive training in an intensive programming course with a workshop format found to be successful ever since the insurance company's training effort began in 1958.

Tailored to fit company needs, the basic course offered by Mony's service center depends heavily on concentrated, individual instruction delivered to a small group of students, according to the course teacher, Lucy O'Neill.

In contrast to many in-house training programs, "we consider this approach considerably more effective than rely-

Professional Development

ing on audio-visual materials to get points across," she said.

Because they are expensive and "don't usually receive rave reviews from students," films are used primarily as "diversionary tactics," she added.

The heart of Mony's training program, the basic course is designed to provide competent personnel for the company's programming maintenance and development (Promad) department, O'Neill explained. Consisting of about 90 people, Promad includes programmer-analysts, systems analysts, senior programmers and the 11 programmer trainees who recently completed the course.

In addition to Promad, the service center contains a computer operations department of some 135 people and a five-person systems services group which provides an interface between

(Continued on Page 2)

Over IBM's SM-1

By Don Leavitt
Of the CW Staff

CLEVELAND — The data center at Bobbi Brooks, Inc. has saved machine time, disk space and operator aggravation since it installed Pansort, an independent utility, six weeks ago, according to systems programmer Jeff Cummings.

That is a short time to feel so confident about any product, he acknowledged, "but we got through end-of-quarter processing as well as our daily work, so it looks like pretty clear sailing till the end of the year anyway."

The clothing maker acquired the Swiss-built software (now marketed in the U.S. by Pansophic Systems [CW, May 29]) after Cummings ran benchmarks comparing its capabilities with those of IBM's SM-1 sort/merge program product. He couldn't use the "free" sort/merge included in DOS, he said, because it doesn't work with 3330 disks.

In the test situation, working with three sorts from the company's normal daily work cycle, Cummings found Pansort ran 16% faster than SM-1. Job accounting data accumulated before and after Pansort was installed confirmed those test results, he added.

With IBM's sort, "slightly over 34 hour/week" were spent on sorting, the pro-

grammer said, noting also that much of that time the company's 384K 370/145 had to be dedicated to the utility run because of the high volumes involved.

With Pansort, "we've averaged between 27- and 28 hour/week," Cummings went on, and with the multiprogramming possibilities under the new sort, operators can often sort in two partitions at the same time, or overlap a sort and an application program.

Disk space and disk accessing have also been reduced with Pansort, and Cummings feels this is due to the way in

which the independent utility does its work. Pansort works in place, he explained, while SM-1 adds a sort key to each record.

This one difference means the IBM-created records are longer than the ones Pansort manages. They take more disk space and, as they are moved around, they take more time for handling.

At the same time, Cummings said, Pansort uses a direct access approach to the sort work files. "As soon as a record is read off," he added, "its space is available

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First U.S. User

Pansort Saves 370 CPU Time, Disk Space

Increased Federal Productivity Tied Directly to DP Utilization

By Nancy French
Of the CW Staff

WASHINGTON, D.C. — A government-instituted productivity study, completed recently to measure increases in efficiency derived from automation between 1967 and 1972, found an average productivity increase of 1.7% per year among the 14 agencies studied.

All but three of the 14 reported gains,

and most of these gains were the direct result of computerization, Assistant Comptroller General of the U.S. Thomas D. Morris told a recent automation technology task force.

He pointed out that prior to this report, no real measures of efficiency existed in the federal sector.

Interesting among the results was a savings of 3,200 man-years in the Social Security Administration as a result of electronic data processing.

Specific increases in productivity were tied to:

- Direct input of data from the agency's district offices via telecommunications.

- Use of microfilm records in the district offices to reduce manual record-keeping using computer-output-microfilm.

- Encouraging health insurance contractors, employers and others to submit data in machine-readable form.

The Veterans Administration (VA) showed a 26% productivity increase since fiscal year 1967, showing upward trends in productivity about every third year, according to Morris. A major project, under way to develop a comprehensive DP systems design, will automate all compensation, pension and education, loan guaranty and insurance programs — for which five million veterans are eligible.

Continuing computer program refinements and the use of optical readers are directly responsible for growth in productivity in the VA, Morris said.

IBM Marketing Policies Pushing 370 Users to Independent Firms

By Ronald A. Frank
Of the CW Staff

NEW YORK — An IBM marketing policy which limits the availability of 370 leased memory add-ons may be forcing third-party customers and others to seek out alternate suppliers.

Actually, independent memory add-ons for the 135, 145 and even the 158 can be desirable items using the latest semiconductor technology at considerable savings over IBM storage. And ironically, part of the reason 370 users are turning to non-IBM sources can be traced directly to IBM marketing policies.

IBM will not supply leased add-on memory increments to users with purchased 370s, except for the 155 and 165. And this category fits users who have third-party leased systems. Although the user is

paying for his equipment on a monthly lease basis, there is always an investor behind the scenes who has purchased the system in order to lease it to the user.

Since IBM will not supply leased memory to these customers, they have had to

Analysis

turn elsewhere. In this case, elsewhere means only a limited few suppliers since only Advanced Memory Systems (AMS) and Intel have thus far produced these memories, although several firms market the AMS and Intel products.

By leasing from an independent, a user upgrading a 135 from 96K to 256K can save up to 50% over the cost of a leased

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SEC Gives Final Approval

Itel Plan Can Cut 40% Off 370 Leases

By Ronald A. Frank
Of the CW Staff

SAN FRANCISCO — Itel has now received approval to offer short-term operating leases under its Investors Group II plan, which can save 370 users up to 40% off of the IBM rates for comparable equipment.

The plan usually gives users two-and-a-half- to three-year leases on 370 systems, which can include independent semiconductor add-on memories as part of the package. Other non-IBM peripherals are also available.

Itel has been seeking approval to offer the plan from the Securities and Exchange Commission (SEC) for over nine months, and the delay in approval forced it to delay implementation of several contracts proposed under the plan [CW, July 17].

Tax Credits to Investors

The firm received approval last week for the plan, which permits investors to receive tax credits. Itel will be offering leases under the plan immediately.

The operating leases will be financed

through a \$50 million fund.

One Southwest user on the verge of signing an agreement with Itel said it was not primarily the savings that made his company consider the Itel plan. "With IBM we were limited to a four-year fixed-term plan with no out, but with Itel we have a one-year out on a three-year contract," he said.

A Way Out

The one-year cancellation provision was especially important because the company is evaluating its equipment needs, and the 145 which will be acquired through the Itel plan may not be the final configuration required, he said.

The firm plans to lease a 370/145 with 256K native storage, 256K of Advanced Memory Systems add-on storage to bring the system up to 512K total, plus Itel's 3330-equivalent disks. The system is expected to cost about 85% of IBM's monthly availability charge (MAC), he said.

Although Itel and the user have agreed in principle, the potential customer said the deal will not be finalized pending placement with Group II investment sources and approval from the Itel investment committee. The user said he believed the deal would be finalized without any problems.

Itel expects to finance a minimum of 25 to 30 370 systems with the \$50 million authorized by the SEC. Itel will sell shares in a limited partnership to raise the funds for the leasing plan. An Itel spokesman estimated the required amount would be raised within 30 days.

There's Strength in Tradition
For Mony Programmer Trainees

(Continued from Page 1)

data processing and the rest of the company, primarily by studying the feasibility of implementing different systems, she commented.

Offered approximately once each year, the programmer trainee class meets from 8:30 a.m. to 4:30 p.m., five days each week for 10 to 12 weeks.

All students are new hires to the company and have completed four years of college. Preliminary selections for the class of about 12 people are made initially by Mony's personnel department, she remarked.

Candidates who succeed in passing a programmer's aptitude test with a score of 70% or better are then interviewed by at least two directors from Promad. She noted this year's class represents about one quarter of those interviewed.

"I try to make the classroom atmosphere as informal as possible, encouraging students to share problems with each other and to compete with themselves," O'Neill said.

Keep Them Studying

For about an hour every day for the first four weeks of the course, she tests students on the material learned the previous day. Both open and closed book exams, the tests are used "primarily to keep students studying."

"Students understand from the outset that no records are kept on their day-to-day test performance," she remarked. Rather than grade her students, O'Neill holds personal conferences with them once every two weeks or so to discuss performance and progress.

Contrary to the concept prevailing in many private DP schools, this course is not committed to making every student who begins it a programmer, according to O'Neill. "We will tell someone when we think he or she is not suited to programming," the instructor said, noting that this year she found it necessary to fire one student on the last day of class.

Students go directly from the training class into program assignments with Promad, based on O'Neill's recommendations to the department's directors.

Most of the training support for the class is designed in-house and consists primarily of handouts. O'Neill added that two self-study courses have been purchased from Deltak and are used occasionally in conjunction with the basic course for students unfamiliar with OS/JCL.

In response to a study on career development conducted by Q.E.D. a year ago, Mony has entered this aspect of training on various levels, drawing most of its teaching materials from IBM's in-shop training courses.

O'Neill said Mony purchases from IBM outline/handout packets which are then used by teachers in the two- to five-day courses.

When the need arises for courses the three-person, part-time training staff lacks

the expertise to teach, the company goes to outside vendors of educational materials. "Ware Associates provides us with bridging courses out of programming and into systems; among these are classes in systems analysis and project management," she said.

While unable to estimate the cost of Mony's DP training effort, O'Neill said she felt there is more cost-consciousness concerning courses developed outside the company.

Similarly, she suggested more impetus exists to formally evaluate the courses Mony purchases. But while she knew of no organized attempt to measure the benefits of the basic course, O'Neill contended its continuation since 1958 testifies to the program's success.

News Update

DP School to Be Taken to Court

BOSTON — Tom Buchan, a dissatisfied graduate of a DP course at the Andover Institute of Business in Boston [CW, June 19] plans to file a criminal complaint for larceny against the school.

The institute was one of several for-profit vocational schools criticized by the *Boston Globe* "Spotlight Team" series for misleading advertising and other abuses [CW, April 17, June 12].

One of the key points in Buchan's complaint is that the school claimed a high placement rate for its graduates, while its own records showed the reverse, noted Stephen M. Salon, Buchan's attorney.

Buchan is seeking the return of his \$1,660 tuition, Salon said, and if the school is found guilty of criminal larceny it could face an additional fine.

Salon described the course Buchan took

as "absolutely, unequivocally worthless." A show-cause hearing on the complaint will be held Aug. 8, he noted.

Meanwhile, Andover Institute of Business in Boston has filed for voluntary bankruptcy, according to the *Globe*. The school's director stated the *Globe* articles had brought the school into economic difficulty and that there wasn't money to mount a public relations campaign to counter their effects.

Another branch of the school, in Wethersfield, Conn., has also closed down because of economic difficulties, a *Globe* spokesman noted.

The *Globe* pointed out in its articles that the Andover Institute of Business in Boston is not related to the Andover School of Business in Andover, Mass.

Xoma Drops IBM, McGill Suits

(Continued from Page 1)

a ruling on it. A second hearing was held July 29.

At that second hearing, Williams said, the motion for further particulars was granted. "Which essentially means that the other party, within 30 days, has to respond to the motion or the original motion [patent infringement] will be struck down by the court," Williams stated.

Financial Difficulties

Xoma's financial difficulties began last May, when the Quebec Securities Commission restrained Xoma Vice-President Eddie Solomon from further dealing in the company's shares.

Solomon, President David Homa said, was acting under the belief that it would be in the best interest of everyone if the price of Xoma's stock was maintained

during the time the prospectus (for the proposed merger with Delstar) was filed before the commission.

"But he got his knuckles rapped by the commission, it hit the press and confidence dropped," Homa stated. "And when confidence dropped, the stock price dropped, Delstar saw what was happening and they backed right off and that made the stock drop even further."

Early in May, Xoma was trading around \$2, according to the *Toronto Globe and Mail*. By June 26, trades were at prices from 20- to 21 cents.

"Xoma's going through some pretty tough times at the moment. In fact, at the present Xoma doesn't even have an office," Homa stated, adding that he has requested the commission to suspend trading in Xoma's shares, "until we see exactly what is going to happen."

Independent Sort Package Saves User Machine Time, Disk Space

(Continued from Page 1)
for another record."

By contrast, IBM follows an approach similar to sequential processing, the user said.

Disk Access Cutback

The cutback on disk accesses can be seen in the new job accounting figures for the sixth 3330 spindle. This drive has a removable pack because the company has one file that needs more than a full pack, and the other drives are committed to on-line work.

The largest, and last used, of the seven sort work areas Cummings set up resides on this drive, he said, and this often came into play with the high-volume sort runs he had under the IBM sort. With SM-1, this drive accounted for 11% of all disk accesses; with Pansort, the figure has dropped to 4%.

The touch the operators appreciate, he went on, is the apparent elimination of the partition labeling run that used to be required about twice a day to cope with the high-volume sorts.

Each of these runs took only "about 25 seconds," Cummings said with a grin, but they interrupted normal processing since they couldn't be done until nothing was running in Background and Foreground 2.

The run had the effect of putting as many sort work areas in Background as appeared necessary to handle the sort. Sometimes even putting all seven areas there didn't give enough room, Cummings said, and then "we were just plain out of luck."

IBM Pushes 370 Users To Independent Firms

(Continued from Page 1)

IBM add-on, according to one independent. On a two-to-five year lease, the cost averages 25% to 50% less than IBM (if the user had leased the system from IBM) and this includes full maintenance, shipping and installation, which can be extra with IBM memory, depending on the deal.

Among the operating advantages of the add-on memories, the users get a smaller physical box. One supplier, Computer Investors Group (CIG), installs the memory on the back of the CPU storage cabinet door. In addition, an Intel memory for the 135 can use one third less BTU/hr than the comparable IBM product for a typical 128K configuration.

Thus far, the memories, which are primarily bipolar technology, are still in short supply. They are available from CIG, Intel and CDC, but some are in short supply with backlogged orders building up. It is also probable that Intel will go to an N-channel MOS technology for the add-on units which might make them even more cost-effective than current models.

Because 135 memories are in a very competitive situation, IBM may feel its product is at a disadvantage. And this may have led to the hard sell IBM marketing letter recently uncovered in one IBM branch, sent against IBM policy [CW, July 24].

The prohibition against purchase customers leasing add-on memory also applies to owners of IBM equipment, but these customers usually are committed to purchasing anyway, so observers say they would normally buy added storage.

Not All Models

The new memories are available for the 135, 145 and 158, but not all models are available from all suppliers depending on their marketing agreements with the manufacturers. New orders may have to wait anywhere from 90 to 120 days for delivery, one source estimated.

With Pansort, the operators haven't had to run the partition labeling run at all, even with the larger than normal end-of-quarter volumes.

Although Cummings related tales of problems with other proprietary packages Bobbi Brooks has used, he was clearly satisfied with the support he has received from Pansophic. He explained that the original coding he got did not unload intermediate files of a multivolume sort, and the system would start to write on the files all over again.

Cummings reported the problem to Pansophic on a Thursday and they came up with a solution by the following Monday. Thanks to the mails, he didn't get the "fix" until the Thursday after that, "but that wasn't Pansophic's fault."

Summing up, Cummings said Pansort (and Westinghouse's Tape Dump/Restore package) "comes as close as any I've seen to being truly 'plug-in-and-run' software."

Credit Card Firms Must Prove Defaults

By Toni Wiseman
Of the CW Staff

MADISON, Wis. — While credit card firms heralded the computer as the solution to all their accounting problems, they may now begin to dub it the cause of their default headaches.

Dane County Judge Archie Simonson recently denied two default judgments sought by creditors on the basis of a new state consumer law requiring that such complaints list not only the amount to which the creditor is allegedly entitled, but also the information used to compute the amount.

"Companies which use centralized computer storage centers are finding it difficult to comply with the requirements of the consumer code," Simonson said. "In the collection of a suit, the complaint has to set forth on its face the details relative to what it's doing, how the interest was computed and how the total was arrived at."

It's not enough to provide the for-

mula, he said. The documents have to show physical evidence of how the figure was actually computed.

"The printout sheet companies supply their defense counsels doesn't go into that detail," he noted. "It just has the balance carried forward, which includes precomputed interest from the time before, and perhaps a few items on very recent purchases. That's not enough."

The Wisconsin Consumer Act was modeled after the National Consumer Act, prepared by the National Consumer Law Center of Boston Law College. It requires that the figures necessary for the computation of the unpaid balance be provided and be accompanied by accurate copies of the writing evidencing the transactions.

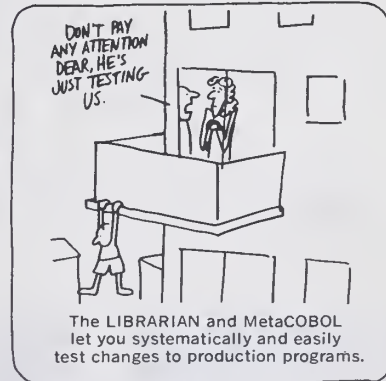
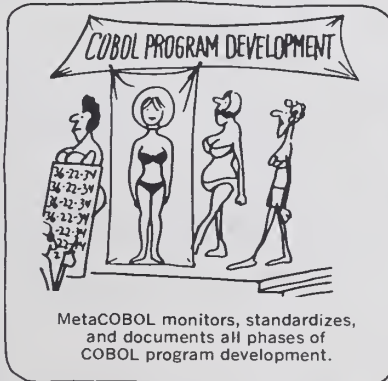
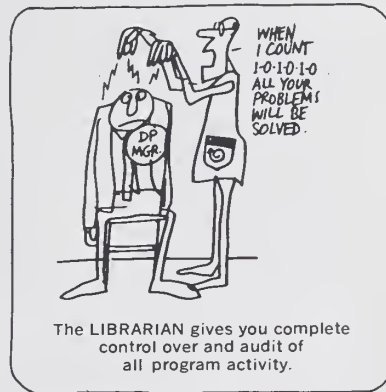
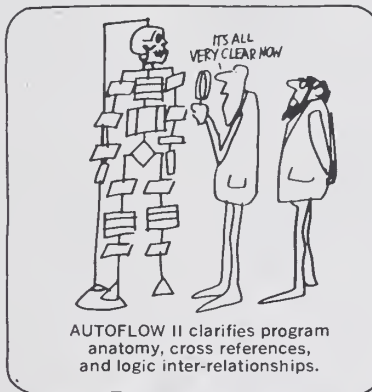
Simonson acknowledged the requirement for particulars may produce hardships for creditors using central DP centers, but said that is a legislative, not judicial consideration.

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*EDP Analyzer, October 1972, That Maintenance "Iceberg," P.1. (Send for complimentary copy.)



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Terminals Consolidate Circulation Tasks

NEWTON, Mass. — Although *Computerworld's* circulation has risen from about 40,000 to 64,000 since 1971, the paper has continued to depend on a nine-person circulation department.

These are the people who handle new subscriptions, renewals, expirations, payments and the general task of getting a



CW Photo by Leslie Flanagan

Sycor systems engineer Janet Shapiro discusses data entry formats for inputting subscription data with Barbara Jeannetti, CW's assistant circulation manager.

copy of the paper in each reader's mail box each week.

CW, naturally, has processed its subscription lists through computers for years; first airshipping punch cards to Chicago where the fulfillment house is, and more recently sending a tape copy of the card data.

Last month, though, the paper updated its master subscription file for the first time with data keyed on intelligent terminals directly from source documents, bringing the previous coding and key-punching steps into one operation.

CW chose intelligent terminals because of "economic reasons, really," noted Margaret Phelan, vice-president/circulation.

The goal was to consolidate the key-punching phase and the clerical "coding" phase into one function, saving time and effort, so the department could handle circulation growth without a corresponding increase in personnel and keypunch machines.

The terminals' editing capabilities are better than the keypunch's, she mentioned, but "not as sophisticated as we'd like to have them." The computer processing the input data still performs the same editing checks it did when the data was keypunched and "we still have to wait for the next update to get rejects back in, some of which could have been corrected prior to going against the master. We hope to upgrade this phase in the near future," Phelan said.

The previous system relied on two Univac 1710 keypunch machines — either could be used for keying or verifying. They were "great," Phelan stated, with minimal downtime and prompt repair service.

Sycor systems engineer Janet Shapiro did the systems analysis and programming for the three terminals and then trained the circulation department in their use.

CW updates its master file of subscriptions twice a month on a 24K IBM 360/20 at Crane Communications, a Chicago publishing firm. The newspaper is printed at Poole Brothers, an American Can Co. subsidiary, elsewhere in the city.

To transmit data for the update, CW's circulation department can pool data from the three keystations onto one cassette that goes on a master station. Transmission is through a Bell 2400 modem at 2,400 bit/sec over dial-up lines to another Sycor 340 at Cogna Systems Co., a subsidiary of Esmark Corp.

Cogna does not process the tape, but notifies Crane Communications that it has arrived. Crane, in turn, mounts the tape on one of its four IBM 2415 tape drives and goes through a process of sorts and edits to create the updated master circulation file, explained Ed Victor, the firm's DP manager.

This tape file is not only the source of renewal notices and invoices to subscribers but is also used to create the address labels, sack labels and mail routing.

Other than the benefits of consolidating the circulation department's work, Phelan noted that the terminals allow the department a little extra time to prepare the update information, since it's transmitted quickly over the phone.

All the terminals have 5K of program-mable memory, she added, with a maximum expansion to 7K.

Even Pre-Watergate

Study Finds Public Trust Down

EAST LANSING, Mich. — Public trust in government and in the performance of politicians was on the decline before Watergate, and that decline has now been measured and correlated with specific political events, according to a report by a Michigan State University social science doctoral candidate.

Working with computerized data compiled over a 14-year period by the Inter-university Consortium for Political Research, Thomas Jukam has attributed earlier erosion of trust to negative attitudes about the Vietnam War and the growing belief among blacks that civil rights promises were not adequately kept.

Developed and administered by the consortium, the survey reached Jukam as coded data on magnetic tape.

Employing a software package known as the Statistical Package for the Social Scientist (SPSS) — available from McGraw-Hill — Jukam used a CDC 6500 computer to run contingency checks and correlation analyses on the data to develop his findings.

In the period covered — from 1958 to 1972 — the decline in trust began to be measurable in 1964, according to Jukam, who explained that distrust peaked in 1970 when 68.6% of the people surveyed indicated the government wasted "a lot" of tax money.

Much of the decline in overall political trust was attributed by Jukam to attitudes about the Vietnam War.

"Those who disapproved of administra-

Meter Runs Out On Love Affair

NEW YORK — This city's "super sleuth computer system" could be partly responsible for breaking up a marriage, according to a story told by a Parking Violations Bureau official here.

Programmed to track down motorists and corporations who owe the city millions in unpaid parking tickets, the system got involved in the domestic matter quite unintentionally.

It seems the system, with a customary lack of discretion, sent a delinquency notice for about \$2,000 in unpaid tickets to an upstate man for fines accumulated by his wife.

The man protested — said the car was his wife's and she hadn't been in the city in five years.

The official sent him copies of the tickets as proof.

When he saw the tickets, the husband noted they were all accumulated on weekday afternoons of the same Manhattan address.

The woman admitted she was having an affair and the husband paid the tickets.

That's all the official knew.

Canadian Protests Data Gathering

OTTAWA, Ont. — Attempts to collect increasingly detailed statistics on individuals' economic situations as a means of evaluating social programs will provoke increasing concern about privacy invasion, Canada's chief statistician told members of the Canadian Information Processing Society convention here.

Sylvia Ostry told the group that "governments have reached a level where new policies and programs are attempts to make relatively sensitive adjustments to the circumstances or opportunities of particular groups, or to represent sensitive modifications in the way existing policies are implemented."

What will really be at issue is the tension in society between those whose mode of thought and action is economizing and technocratic and those who are anti-institutional.

"It is this tension which is ultimately the most fundamental problem of the post industrial society," she said.

A Vancouver journalist, Allan Fotheringham, advanced the anti-institutional view with a series of recent columns

about a Canadian survey in which he was asked to participate.

"There is growing paranoia about privacy, and in some instances, governments are to blame for having broken the trust under which information is collected," he said.

In his own case, he was incensed when officials began calling him at home to remind him to complete the questionnaire.

It seems they had gotten his unlisted phone number from his census form.

"I will not report my phone number again," Fotheringham said.

Retail Credit Witnesses Set

WASHINGTON, D.C. — The Federal Trade Commission (FTC) has assembled 200 witnesses for its administrative hearing on a cease-and-desist order against Retail Credit Co., the largest company in the business of checking credit and personal backgrounds of people seeking credit.

The case is expected to come before Administrative Law Judge Alvin Berman no sooner than late fall.

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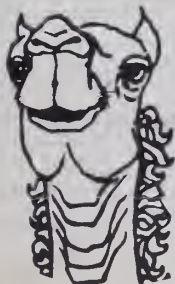
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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Operator Strike Slows 6 Scottish University Centers

Special to Computerworld

GLASGOW — Striking computer operators recently stymied an attempt by a Scottish university computer center to continue functioning by transferring work over telephone lines to a center in England.

Members of the Association of Scientific, Technical and Managerial Staffs (ASTMS), a union described by some sources as "militant white-collar," the strikers were fighting to receive the same benefits that laboratory technicians at Scottish universities receive.

The technicians received a 21% salary hike four years ago that excluded the operators. The operators had no luck in obtaining the reclassification that would have qualified them for the raise until this year, when the ASTMS came to a reclassification agreement with most of the universities.

But at six universities, operators held out on the agreement and went on strike in April.

The effects of the strike varied, often within the same university. At Glasgow University, where three computer centers are maintained, work on one computer that serves academic departments via data links to other centers was halted when ASTMS members there contacted ASTMS members at Nottingham University in England, who agreed to discontinue all Glasgow work.

Glasgow's second computer center remained operative because its operators were not ASTMS members, and the third computer continued partial operations because ASTMS members in that center felt the DP manager there had shown good faith by fighting for their reclassification from the early days of the dispute.

At Aberdeen University, where not all operators are members of the union, union members attempted to shut down

the center with a sit-in. Several days later, they were evicted by court order and computing continued.

Seven-Week Halt

But at Strathclyde University, strikers managed to close down the computing center by sitting in for seven weeks. Jim Campbell, chairman of the computer staffs committee there, reported that no work was done on the main computer or on the data link to the regional computer in Edinburgh.

Several minicomputers used for systems development work, however, continued to be operated by members of the Association of University Teachers, which specifically directed its members not to do any work on the main computer.

The finance department at Stirling University had to resort to manual methods to handle paychecks when strikers shut down the computer. Mail delivery to the university was also hampered when postmen refused to cross picket lines set up by the strikers.

An IBM 370/158 at Edinburgh University posed special problems for the strikers. Operators at that center had struck earlier, settled their strike within a week, and were working again by the time the other strikes began. But operators refused to handle any work received over data links from Glasgow and Strathclyde.

The strike was settled June 18, when the University Committee for Non-teaching Staff agreed to begin national negotiations with ASTMS.

In Social Services File Updates

On-Line Inquiry Saves Michigan \$900,000/Year

By Patrick Ward
Of the CW Staff

LANSING, Mich. — When the State of Michigan's social service department found there was an average 60-day lag between the time a social worker cleared a client for Medicaid and the time that person was registered in its computer files, the department decided to consider an on-line inquiry/update system.

The previous situation had bills coming from hospitals before the department's computers would accept them, recalled Edward E. Updyke, director of planning and administration for the state's health and welfare data center.

Now, two years after the department began putting 200 on-line CRT terminals in regional and county offices, the state is saving itself \$900,000 a year, and new Medicaid client updates take one day, according to Updyke.

Besides the quicker update capability, the state's studies had predicted that an on-line system would allow statewide checks to determine a welfare client's eligibility, would provide better access to

statistical information and would cut the problem of documents lost in transit between remote offices and headquarters here. Updyke said these predictions have been generally borne out.

The department has installed about 125 Univac (RCA) 751 CRTs in its regional offices, plus about 75 Univac 752 CRTs in the larger county welfare offices.

A homegrown Client Information System data base resides in a 524K Univac 70/6 mainframe running under version 20 of the TDOS operating system. The system is dedicated to the on-line task from 8 a.m. to 5 p.m. five days a week, Updyke stated.

The system forms the data base for the state's Medicaid and Aid to Dependent Children programs and furnishes a state-wide inquiry capability for the general relief program.

Additionally, Michigan's 4,500 social workers can use the terminals to check out a file of county, state and federal welfare rules.

They call up terminal operators at the regional center, identify themselves and the client with codes, and relay the information, most of which is address changes and the like, Updyke said.

Terminal operators can retrieve a client's file by means of his name, case number or Social Security Number, Updyke added.

Under the previous system, county welfare offices mailed in data, which was keypunched in Lansing to update files.

If there was an error in a document it was put back in an envelope and mailed to the county, he recalled.

The department chose to install the Model 751 terminals in the regional centers where use is heaviest, Updyke said. The 751's full-duplex capability allows eight CRTs connected to a controller to transmit at 4,800 bit/sec over a line with less contention and better response time than three or four of the half-duplex 752s, he said.

The terminals transmit over the leased

lines of the state's Telpak network into a Communications Channel Multiplexer at the central site. The configuration also includes 40 spindles of Univac 590 disk drives and four Univac 42 tape drives.

A second 524K Univac 70/6 handles batch processing, and a 393K unit does medical assistance batch processing.

Cost Justified

Updyke said the department went to the on-line system "knowing full well that an on-line system is expensive," but with the expectation that the cost of mail mixups and other lost data and delay, together with an improved ability for the department to find fraud and errors, would more than balance this out.

According to his figures it has. The original estimate was that the added cost of the on-line system would be \$1.03 million above the projected cost of running the manual system in 1973-74, but that the automated system would bring a savings of \$1.97 million, primarily in typing and mailing and other personnel expenses.

The cost of the system includes \$50,000/mo for use of the computer system for two and a half shifts daily, plus \$700,000 yearly for CRT lease and maintenance and \$400,000 in line costs.

The on-line system has been reliable, with several weeks of 100% uptime, Updyke said. But the installation has reached the limits of the three mainframes' capacity, he stated, and the department plans to replace them with a dual processor HIS 6080 system by July 1975.

The move will also reduce the department's processing costs, Updyke noted.

Updyke said the department sent out competitive bids, and HIS had the lowest priced system to pass the department's detailed benchmarks.

Other finalists were Univac's 1110 and Burroughs' B7700, he added. IBM made an initial bid, but dropped out of contention before the final round.

Computer Calls Plays for Officials

COLUMBUS, Ohio — The Ohio Athletic Conference, a league of 14 small colleges, claims it is the first athletic conference in the nation to use a computer program to pick officials for its events.

The system produces both an officiating schedule for the season's games and individual schedules for the officials, according to a conference spokesman.

Bob Brown, the conference's supervisor of officials, used to spend over 100 hours annually in juggling the officials' availability, selection criteria and the list of games to come up with the assignments, the spokesman said.

Time for Evaluation

Having the computer do the job frees Brown to spend more time evaluating officials in the field and hiring new ones, he noted.

"We hope this is going to produce more competent people in our ranks... [and] better officiated games," he explained.

And by taking the human element out

of selecting the officials, the computerized system becomes the "fairest way all around," the spokesman noted.

The system has already picked 70 football and 80 basketball officials for the Ohio Athletic Conference's upcoming season and is bringing in some money by picking officials for schools outside the conference, the spokesman noted.

The program runs on a 196K (36-bit word) Univac 1108 at Chi Corp., a for-profit service bureau owned by Case Western Reserve University in Cleveland.

Shortage Extends Jobs

BALTIMORE, Md. — A shortage of computer paper here has delayed efforts to notify notaries public that their commissions are terminating.

As a temporary solution, Maryland attorney general Francis Burch has issued a ruling making it legal for notaries to perform their duties up to 30 days after their commissions expire.

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COMPUTERWORLD

'College for Kids' Teaches How

Students Find Programming Child's Play

By Edith Holmes

Of the CW Staff

KENTFIELD, Calif. — Quick... what would a \$1 investment be worth in five years if it earned 6% interest compounded daily?

Solutions to this problem and others like it are being calculated this summer on a computer programmed by several high-potential children at the "College for Kids" here.

Offered under a special enrichment program for county children at the College of Marin near San Francisco, the computer workshop class is one of a dozen courses ranging from astronomy to marine biology.

When launched two years ago as a summer session experiment, College for Kids had a student body of 14. Today, the program is year-round with some 300 boys and girls aged five to 16 enrolled for the 1974 summer quarter. More than 1,000 children will have the opportunity to participate during the 1974-75 academic year.

Each class numbers about 15 children of mixed ages, but despite the differences in years, a spirit of cooperation develops because a no-grades policy eliminates competition for good marks, commented teachers involved.

The philosophy behind the program is "enhancement, not advancement," according to the head of the project, Dr. Jared B. Sharon, assistant dean of instruction at the College of Marin.

"Our program is not intended to advance a student beyond the grade to which he normally would be assigned, but rather to enrich his background," Sharon said. "Our central purpose is to make available learning experiences, such as working with computers, that any single school district could not provide by itself."

Requiring about \$26 per child per course, the program is financed by the College of Marin, a Marin County school and parents, in addition to the school districts. Over a third of the amount collected goes to provide materials for the children. The rest of the money pays for teachers and an administrator, as well as duplication costs and field trips, accord-

ing to Sharon.

Youngsters in Elaine Reber's two computer classes spend about half of each two-hour session learning fundamentals like computer math, flowcharting and Fortran.

During the remaining hour, they work with an IBM 1130 in the school's science computer center. Aside from solving compound interest problems, the students also use the computer to direct the landing of a lunar module on the moon. In addition, the children play games on the machine like tic-tac-toe and battle of the numbers, a digital version of pick-up-sticks.

"My main aim is to teach the children to use the computer as a tool," Reber, a programmer for 11 years, commented. "The students know when they've achieved this goal. I don't need to tell them."

Even though those children with some

background in algebra tend to adapt more readily to programming, age and motivation can be more significant learning factors, she added.

"Ten- to 15-year-olds comprise the best age group for working with the computer, while nine-year-olds usually haven't acquired the conceptual maturity necessary," Reber explained. But "a ten-year-old with a great deal of interest can easily outstrip an unmotivated 15-year-old at a terminal."

Children are nominated for the College of Kids program on the basis of criteria determined locally in each of Marin County's 12 school districts. But Sharon emphasized the students are not among the "identified gifted," the exceptionally talented.

"Very little tends to be done in the way of additional programs for the above-average child — the potential leader in scientific or industrial fields," he com-



Thirteen-year-old Carolyn Deasy, student in a computer class offered at the "College for Kids," experiments with the console of an IBM 1130 under the guidance of teacher Elaine Reber.

mented. "College for Kids attempts to fulfill this need."

Any institution interested in setting up similar programs is welcome to contact Sharon at the College of Marin, Kentfield, Calif. 94904.

Thinking about distributed computing? Lockheed System III gives you RPG II plus a price advantage.

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Editorial

Never-Ending Delays

The recently granted delay in the trial date for the government's antitrust suit against IBM is the result of years of neglect and delay by both sides.

Each side is responsible for the great deal of time it has taken — almost six years — to bring the case to trial, and while neither deserves blame for the latest delay, both are at fault for wasted time and missed opportunities in the past.

And that delay, coupled with hearings before the Senate Subcommittee on Antitrust and Monopoly, clearly shows the need for reform in our present antitrust laws.

The IBM case is a perfect microcosm of the problems the U.S. faces generally with enforcement of laws in the field.

The case was almost completely dormant from the Department of Justice's viewpoint for three years, a victim of a change in administration and a change in philosophy regarding antitrust that accompanied that political change.

At the same time, IBM, which clearly has a right to a speedier trial than it is receiving, did little to push for action during those early days of the case.

This lack of action on each side is particularly disturbing in light of the importance of the case to business and industry.

It was only after a single judge had been appointed to hear the case that action really started, and that was almost four years after the case was filed, far too long.

The government since that time has often seemed to observers to be outmanned and outgunned by the large legal staff mustered by IBM for its defense.

The government has almost admitted as much by accusing IBM of filing harassing motions designed to slow the government in its preparation of the case.

But IBM clearly should be allowed to file any motion that it feels will aid in its defense preparation and has filed several motions that allege certain government departments have been less than responsive in answering IBM inquiries as directed by the court.

In addition, it is important to remember that in order to file many of these motions, IBM also ties up lawyers that could be working on more substantive matters bearing on its defense.

But it seems IBM can afford the resources, while the government refuses to put enough manpower on the case to uphold its side.

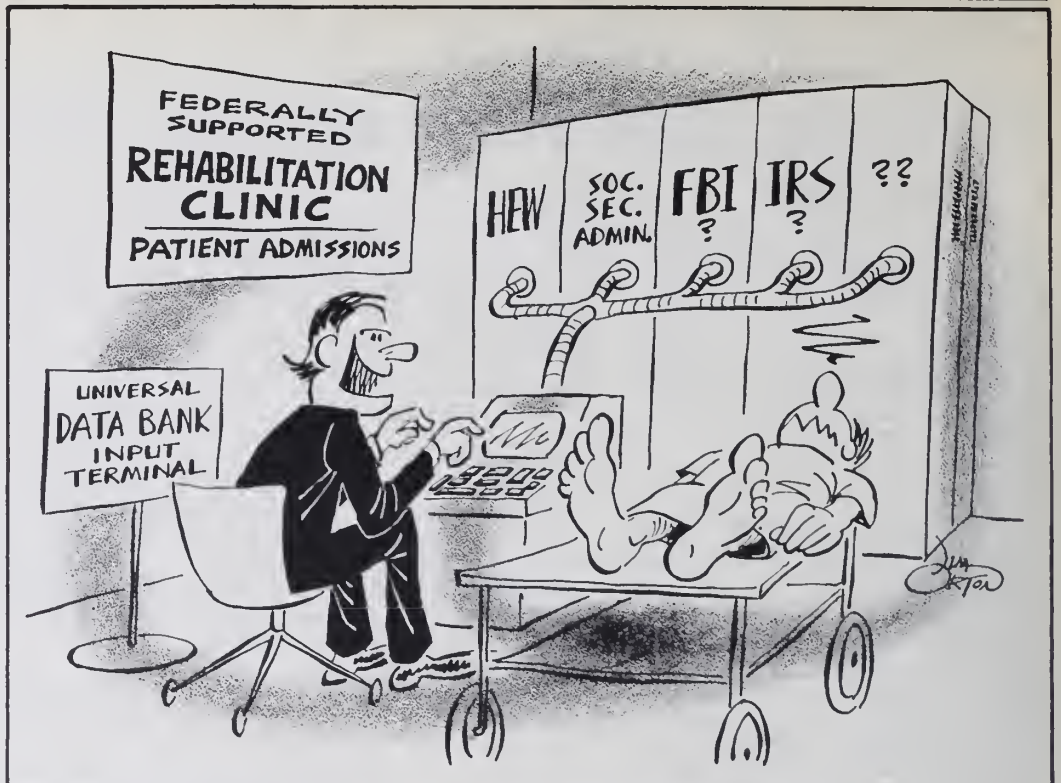
The government should have realized early that IBM would go to the maximum possible extent to defend itself and should have been willing to assign the necessary manpower.

IBM contends it could be ready for trial on the originally scheduled Oct. 7 date; it is disappointing that the government couldn't devote enough financial and manpower muscle to its preparation to be ready on time.

Of course, Judge David Edelstein had little choice but to grant the delay requested by Justice, because the case is too important for either side to be unprepared when the trial starts.

But it is a sad commentary on the working of our laws in this area when an entity of the size and strength of the U.S. Government will not devote the resources needed to meet deadlines it in fact requested.

The Industrial Reorganization Act proposed by Sen. Philip A. Hart (D-Mich.) may not be the answer to this problem, but clearly it is time to update our antitrust statutes.



'Now Give Me That Social Security Number Again'

Letters to the Editor

Independent Users' Group Needed To Shape Future of the Industry

It is essential that data processing users form an effective, independent organization if we are to help shape the future of our industry. Thus far we have been at the mercy of large equipment vendor organizations who have determined our past and present.

The domination of our industry by one super-large hardware vendor will make it difficult for us to take bold steps as a group to initiate the necessary pressures beneficial for our future.

Continued failure to take some group action will certainly prevent us from being as cost-effective as we should and could be. This fact alone should prompt us to do something.

Some ideas and hopes that come to mind in thinking about a users' organization are:

- The major emphasis should be directed toward future industry needs from a user point-of-view in the combined areas of software, hardware and supplies/services.
- Vendor organizations should not be permitted a voice in planning sessions or expected to provide financial support.
- A full-time staff should be employed to implement reasonable goals of user-member boards/committees. This should enable the organization to have competent people who are accountable for results in an acceptable time period.
- An information data bank should be created to provide user-members with names of other members who are experienced in problem, product or service areas of interest.
- A goal should be to enable users to move from one hardware vendor to another with the ease of replacing a Chevrolet with a Ford automobile.
- Implementation of industry standards that make good economic sense to users should be developed and encouraged.
- A means for effective user-member communication should be provided.

Robert G. Frerking

Director of Data Processing

Missouri Farmers Association, Inc.
Columbia, Mo.

PM Depends on Type of Device

I was happy to see an article on preventive maintenance (PM) [CW, July 17]. However, as a long-time practitioner of the art, I must disagree with the oversimplified way in which it was treated.

There is a great distinction between electro-mechanical and purely electronic devices, e.g., a printer and a disk controller.

In the first case, lubrication, cleaning, mechanical adjustments and periodic parts replacement are all necessary parts of PM.

In the second case, the field engineering axiom,

"If it's working, leave it alone!" has proved to be the best policy. In most cases the amount of PM required depends on the number of moving parts.

Technician Induced Failure (TIF) does happen. There isn't a field engineer alive who does not have a few painful memories of times that he "blew it." The measure of a good field engineer is not that he never makes mistakes but that he makes them infrequently and recovers quickly when he does.

Duncan Penman

Comma Corp.
San Francisco

A Not-So-Fond Farewell

A frequent contributor to *Computerworld*, as well as other systems trade publications, I am now taking leave of your pages. For after too many years of the good fight, I finally acquiesce with the realization that the odds are just impossible.

Too many years of observing that the systems and computing "profession" is retrogressive as such. We have been pushed, shoved and sabotaged at every turn by The Manufacturer (and its milquetoast dwarfs); by its many practitioners (an insecure gaggle of obfuscating bit-fiddlers); by The Professional organizations (the only real professionals of which are the paid executives who dabble in high-sounding objectives and money-grubbing seminars and conferences); and last though not least, the Bookkeepers (inevitably confused by and jealous of the systems and computing people).

This unholy alliance has prevailed over truth, logic and light, fighting off the menace of systems and computing honesty for now, but in what surely must be a rearguard action. The truth will out, but not in my day. Too bad visionaries and altruists can really only set stages and rarely take part in the performance.

So, goodbye Herb Grosch and CW; goodbye Datamation, goodbye ACM, ASM, DPMA, Afips, and the rest; and goodbye to the handful of fighters and all you pussycats: it is out of your hands, but it will come to pass that reason will prevail.

Tom O'Connor

Cheyenne, Wyo.

More Ways to Save Paper

There is one excellent way to cut down the use of paper when testing Cobol programs with the Trace option.

The Trace option output is assigned to a temporary data set rather than to a SYSPRINT data set. The temporary data set is further processed with a rather simple program. The Trace output can be rearranged to print horizontally rather than vertically, producing a 20 to one saving in print lines.

David M. Bernstein

New City, New York

Computers in Society: Impact Still Burning Question

By E. Drake Lundell Jr.
Of the CW Staff

The questions surrounding automation in society grow more serious every day, and it is now evident that reasonable and in-depth discussion is needed.

In many ways this debate could have more far-reaching effects and consequences than any others that have taken place in the computer industry about its relation to society at large.

It is clear that computers can be applied in many manufacturing situations and other labor-intensive areas and that such applications will have a great impact on society.

Industrial robots are no longer science fiction; they are now technological facts on assembly lines in many industries and will become even more widely used as prices come down and wages go up.

The use of such automated equipment has great potential for alleviating boring, dangerous and dirty jobs, thus freeing people for more creative tasks, according to proponents of such equipment.

However, the elimination of such jobs raises some serious social problems that cannot be skipped over lightly.

In a time of rising unemployment, several thinkers have indicated that any elimination of jobs would not be in the national welfare unless other jobs are created to take their place.

It has long been a matter of faith in the computer industry that computers have created more jobs than they have dis-

placed and this may well be true, to an extent.

One problem is that many of the jobs that are created through the application of computer equipment are not jobs that can be easily learned by those being displaced.

For example, by eliminating many dirty, boring or repetitive jobs, employment opportunities for poorly educated laborers are eliminated from society.

It is patently unreasonable to expect a laborer with minimal education to become a programmer overnight after his job has been eliminated.

And unless society is willing to devote far greater resources to retraining programs for displaced workers, it is unlikely that such workers will ever be trained for meaningful, creative jobs.

Less Jobs in Future

In addition, while it has been true in the past that computerization and automation have created more jobs than they have displaced, this may not always be true and is, in fact, becoming less true each day.

Most of the jobs created by computerization fall into two major classes: programming and data entry operations.

The computer industry itself is not highly labor-intensive and does not create many new jobs on production lines. But there has been — and continues to be — a growing demand for programmers who translate users' desires into code and in-

structions that can be handled by computer systems.

However, there are currently two trends that may lessen the demand for programmers in the future. First, the programming task itself is becoming more automated as debugging, documentation and flowcharting programs aid programmers in their tasks.

Analysis

Secondly — and more importantly — operating systems are becoming more sophisticated and more usable by the ultimate end users. Most manufacturers and others in the industry are spending literally millions and perhaps billions of dollars to develop operating systems that largely eliminate the need for end-user applications programmers.

If such systems are perfected, and they are getting better every day, a businessman will be able to write programs to answer his needs without the intervention of a programmer.

Thus there will be a need for some systems programmers, but less and less demand for applications programmers, which make up the bulk of the programmers and analysts employed today.

It should be added that we are nowhere near that ideal point today, but the storm warnings are clearly there and should be

heeded.

And when that point arrives, one of the major employment areas in the computer field is going to be sharply impacted.

Much the same trend is taking root in the data entry area. The function itself is becoming more automated — thus slowing the demand for new employees — and it is being taken over increasingly by ultimate users as opposed to specialized people just employed for data entry operations.

Doubtful Claims

As the demand for personnel in these two areas moderates, the claim that computer use creates more jobs than it eliminates may well go by the boards also.

In addition, there are several other social questions raised by the increasing use of automated equipment.

Clearly many labor unions see the use of such equipment cutting into their potential membership base — a move that they can be expected to fight.

Also, the elimination of many so-called menial jobs will place a burden on the educational system since it will be required to better prepare people for the more demanding jobs that will be available.

The problems raised by automation in society may not be at a critical point yet. But only in-depth study now will prevent automation from becoming a major social issue of the 1980s.

DP Firms' Programming Practices Set Poor Example

Every now and then we are told that the computer mainframe firms and others in the industry are not merely good at manufacturing computer supplies and hardware, but also that by this fact they are "expert" at giving us advice on how to use them. This concept of expertness seems not to be really supported by some of the output produced by the firms' own computer systems.

This week I received two examples of such output, one from a computer vendor — Honeywell — and the other from one of the major computer suppliers — Memorex.

The "hiccuping" computer case was a bill (Figure 1) for Oscar Ortega's attendance at a Honeywell course on June 5, 1974. The enrollment fee was given as \$25 but Ortega's attendance was shown twice and so the bill came to \$50!

As the comment came in from University Community Hospital's R.D. Fry, "In this period

of rapid inflation and tight money this appears to be an excellent way for organizations to double their income."

Looking at the bill it seems at first that there was a printing error. Many of the lines were duplicated, being repeated straight under each other, although the heading itself does not appear to be duplicated.

Factually, it does not seem to be quite as simple as that. At the top, the first two lines were duplicated but not immediately. Instead, one line with the words, "MAIL REMITTANCE TO:" was followed by another with the words, "UNIVERSITY COMMUNITY HOSPITAL" and then the pair of lines was repeated. Moreover, the key element (the summation of the total amount due for enrollment fees) was given as being \$50 showing that the duplication of lines occurred sometime prior to the summing of the total amounts.

In its wake this brings another problem. The distance between the printed information on the bill only allows a certain number of printed lines. Yet on this bill the line number was printed with the result that the amount due was almost entirely obscured by the printing.

In a normally well-constructed program utilizing printed sta-

tionery a line count would prevent such an occurrence at the time the final data was being edited for output. Presumably it appears then the Honeywell programming system has one clear set of formation errors, another set of arithmetic errors, and an omitted necessary line count.

Memorex's 'Too-Good' Memory

The other case deals with the too-good memory of the Memorex computers. In its invoice to Commercial Business System, Inc. of Dallas, Texas, Memorex states that the total amount past due is substantially higher than the total balance due.

The story started on April 28 when some merchandise was ordered on a net 30-day account and was invoiced on April 30, two days later. The material was returned in the first week of May and a credit was asked for and issued on May 31. But a June Memorex statement showed this transaction as a separate item and claimed that the original amount of \$168 was then one day past due.

After further correspondence from Memorex, which continued to ask for payment for the \$168 amount on which full credit had been granted, a second statement on June 15 (Figure 2) repeated the error and showed the delightful idea of a total past due of \$351.75 with a total balance due of only \$183.75.

It would be easy to laugh at these items as being examples of the traditional fact that the cobbler's sons are always wearing the worst shoes, but a more thoughtful approach is to note the fact that both the Honeywell and the Memorex statements include a suggestion that correspondence may be needed — Memorex goes so far as giving the name of a Mrs. Liz Amundsen to whom people are expected to address questions.

In fact, the billing operation is one of the most checked operations. Accuracy in billing is not essential because the environment will normally provide some level of checking — certainly it should provide the level of checking that will prevent billing for one course being made twice on the basis of a single document, or the level of checking that will prevent Commercial Business Systems from paying an incorrect \$351.75 past due amount, no matter what the demands are.

Philosophically then, it can be argued that there are at least two levels of computer programming, and that the skill involved in producing acceptable programs differs from one to the other. On the first level there is self-checking to a certain extent, and one can therefore take this fact into account when deciding whether additional care in programming or testing the programs is necessary.

In contrast, on the second level there is no self-checking and presumably a superior level of care is needed there.

Of course, if we take this way of looking at things, which seems to me to be a good one, it indicates not merely the obvious fact that the use of computers by the computer suppliers

should not be taken in any way as a guide to acceptable practice for commercial operations, and these companies should not be regarded as being skilled until such time as they show significantly improved systems, but also that people who are trained at one level of skill — the lower or self-checking level — should be retrained before they are permitted to attack real computer applications.

In general, this is not being done and the distinction between the importance of good programming in self-checking and nonchecking cases is hidden by such systems as the single level certification of the Certificate in Data Processing.

It would appear, therefore, that there are many questions regarding the capability of the profession to really undertake reliable data processing that will continue to be asked as long as cases such as the "hiccuping" Honeywell and the "too-good memory" Memorex billings are around to remind us of our deficiencies.

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PLEASE SEND CORRESPONDENCE TO:

MEMOREX CORPORATION
MEDIA DIVISION
P.O. BOX 645
SANTA CLARA, CALIF 95052
408/917-1000

STATEMENT OF ACCOUNT

MEMOREX CORPORATION
MEDIA DIVISION
P.O. BOX 37463
SAN FRANCISCO, CALIF 94137

Customer Address

COMMERCIAL BUSINESS SYSTEM INC
6449 NORTHFORT
DALLAS TEXAS 75230

TRANSACTION DATE INVOICE NUMBER PURCHASE ORDER NO. (C) BSN NO.

IC 04/30/74 0044262 V/JACK SHEPPERD 168.00 168.00 15
IC 05/09/74 0051490 V/JACK SHEPPERD 183.75 183.75 6
CM 05/31/74 0057635 V/JACK SHEPPERD 168.00 168.00

PLEASE REVIEW THE NATURED BALANCES AGAINST YOUR RECORDS. IF PAYMENT HAS BEEN MADE, PLEASE ACCEPT OUR "THANK YOU".

LIZ AMUNDSEN (MRS)

CURRENT BALANCE 168.00 TOTAL PAST DUE 351.75 TOTAL BALANCE DUE 183.75

Figure 1. These extracts from a recent Honeywell invoice indicate more than just an I/O problem.

Honeywell HONEYWELL INFORMATION SYSTEMS INC. ORIGINAL INVOICE

B UNIVERSITY COMMUNITY HOSPITAL MAIL REMITTANCE TO:

B UNIVERSITY COMMUNITY HOSPITAL
1 T P O BOX 17735-13505 N 31ST
1 T P O BOX 17735-13505 N 31ST
L O TAMPA FL 3 412
L O TAMPA FL 33512
L

HONEYWELL INFORMATION SYSTEMS INC
HONEYWELL INFORMATION SYSTEMS INC
POST OFFICE BOX B1691
POST OFFICE BOX B1691
MINNEAPOLIS, MN 55480
MINNEAPOLIS, MN 55480

STUDENT NAME COURSE NUMBER COURSE DATE ENROLLMENT FEE TUITION FEE CUSTOMER PO NUMBER

ORTEGA OSCAR NI-HOL 236 6/05/74 \$25.00
ORTEGA OSCAR NICHOL 236 6/05/74 \$25.00

TOTAL AMOUNT DUE FOR ENROLLMENT FEE(S) \$50.00
TOTAL AMOUNT DUE FOR TUITION FEE(S) \$50.00
TOTAL ENROLLMENT AND TUITION \$50.00

PREPARED BY

Figure 2. This extract from a recent Memorex statement again shows programming amateurism.

Don't Count Diapers Before Terminals Are Delivered

By Thomas K. Christo
Special to Computerworld

It very often happens that after entering into a complete contract for perhaps the purchase of hardware, either or both of the parties to that contract determine that there are additional terms or agreements which they meant to include or which are now germane. It then becomes necessary to a) enter into a new contract and cancel the old one, b) enter into an additional contract or c) modify the existing contract.

The lazy man's way (and the most frequently employed method) is the latter—to modify the existing contract. This practice is not without its pitfalls, as will be demonstrated by the following sad tale of Livewire, Inc. (communications terminal manufacturer) and Speedy Data (prodigious data processing manager of a huge interstate diaper cleaning service).

Speedy Data had been very effective in setting up inventory control and billing systems for his employer, the We Sit Better Diaper Cleaning Service, so the

company might keep track of the influx and outgo (as it were) of its diapers in 29 regional offices in the New England area. In addition, there was an inventory control function which effected automatic reordering of supplies. The entire system was batch, with eight-hour turnaround.

Professional Practices

However, as the business became more sophisticated and grew larger, it became clear to Speedy that a real-time (or at least on-line access) capability was needed and that each of the 29 regional offices should have a data terminal. Enter Livewire, popular producer of the LW86 CRT terminal with alphanumeric capability.

Livewire sent a salesman to see Speedy and they discussed the problem. It was agreed that 29 terminals were needed with a capability of transmitting daily sales to the home office DP facility and

receiving inventory on hand from the home office DP facility.

Since all inventory items already had numeric codes assigned to them, a numeric keyboard was all that was necessary. It was therefore agreed that the LW86NC would be adequate for Speedy's needs.

However, Livewire's salesman did make it clear that the LW86NC was capable (with slight modification) of handling alphanumeric data if that should ever be required. A contract for purchase of 29 LW86NC terminals was signed.

A month before the delivery date, Speedy had a meeting of all 29 regional sales representatives. They were all complaining about the delays they had encountered in invoices being sent from the home office to the customers.

It appeared that the main problem was not in the actual production of the invoices (off a high-speed printer), but in the mail room, which was simply too small to handle the continually increasing load of outgoing invoices. It therefore

became clear to Speedy that if he could arrange to transmit all invoices via the new terminals to the regional offices, the regional representatives would then have the responsibility of seeing to it that these invoices were mailed promptly.

After the meeting Speedy immediately called Livewire. The salesman and Speedy agreed that the LW86NC would be modified to accommodate alphanumeric.

The salesman told Speedy this could be done without any additional charge to the existing contract price, but Speedy was uneasy. Since there was a "totality of agreement clause" in the contract, Livewire's salesman added the following paragraph to the original written contract. "... (date) the preceeding agreement is hereby modified as follows: the said LW86NC terminals as set forth in paragraph 2b herein are to be delivered to the purchaser with alphanumeric capability. If the said LW86NC terminals do not perform with adequate alphanumeric capability, the seller shall be considered to be in breach of this agreement."

The salesman then sent the contract to Speedy for his signature. On receipt, Speedy immediately signed and was quite satisfied that his rights were protected. Then came the day of delivery.

Speedy had already modified his system to provide for on-line transmission of invoices to the terminals and had therefore undergone some extensive system changes. The terminals were delivered, but they only had numeric capabilities!

Speedy immediately got on the phone to Livewire. It turned out that Livewire's salesman had left to join a nonprofit foundation as a systems analyst in Nepal. Livewire professed ignorance of the whole situation and turned the matter over to its attorney, Sam Sleazey. The We Sit Better Diaper Service in turn hired Terry Trueheart, attorney-at-law, to defend its interests.

Sleazey alleged, that Livewire was under no obligation to supply terminals with alphanumeric capability, since the original contract did not call for that and no "consideration" was supplied by either party for modification of that contract. Consideration is "the inducement to a contract, the sales price or compelling influence which induces the contracting party to enter into a contract" (Black's Law Dictionary, 4th Edition, West Publishing Co., 1968; see also Mills v. Wyman, 3 Pick. 207 [1825] Supreme Judicial Court of Massachusetts). Under the law, without consideration, no contract is legally enforceable; it merely becomes a gratuitous promise.

However, in this instance, Trueheart countered with a theory that Livewire supplied consideration in that it underwent a detriment—it agreed to make the entire contract, pursuant to the modification, voidable if it failed to supply alphanumeric capability on its terminals.

In turn, Speedy also supplied consideration on behalf of his firm—in reliance of the promise of Livewire, Speedy set about to substantially modify his system and alter his software to prepare for the alphanumeric terminals.

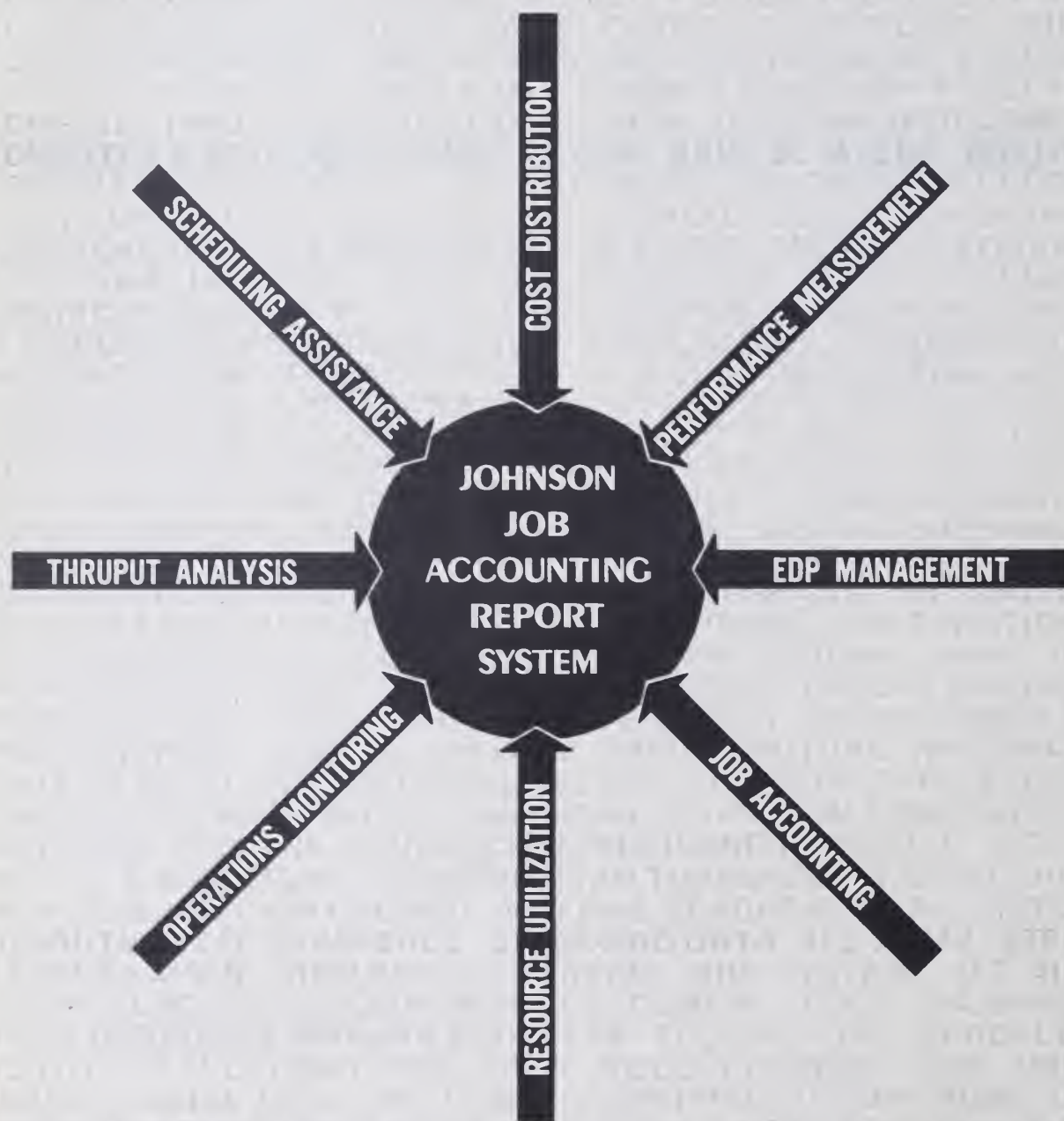
One who incurs an actual or potential risk of loss is said to have undergone a detriment, and detriment is consideration to support a contract (see Coleman v. Eyre, 45 N.Y. 38 [1871]).

When Speedy changed his firm's software, in reliance upon Livewire's promise, that reliance may be said to be adequate consideration to support the modification to the contract (1 Williston on Contract, Section 112, p. 232). Since there is consideration being supplied by both parties to support the modification of the contract, Trueheart's contention wins out.

The moral of this little anecdote is if you must modify a contract, make sure that both parties contribute something new to that deal (even if it is only detriment for a changed position "in reliance").

Thomas K. Christo is an attorney in Boston, Mass.

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Random Notes

Unauthorized Use Blocked, Reported on SMF by 'DAS'

SAN FRANCISCO — The Data Access Security (DAS) system, now available from Computer Trading Corp., protects OS/360-370 installations against destruction or unauthorized use of sensitive data sets. Working with JCL statements or TSO procedures, DAS ends unauthorized accesses and records all attempts and failures through SMF facilities.

DAS operates on "all versions" of OS and is delivered with source and load libraries, technical description and logic manual. DAS can be acquired for \$4,400 from 465 California St., 94104.

Option Analyses Offered

WALTHAM, Mass. — Banks, insurance companies and other institutional money managers can have updated analyses of Chicago Board of Options Exchange activity through the Interactive Data Corp.'s network, by utilizing the RSI Option Evaluator software.

Developed by Interactive to Reynolds Securities, Inc. specifications, the new service enables managers to obtain an immediate evaluation of their own option situations and to simulate the effects of various strategies or market changes. Interactive explained from 486 Totten Pond Road, 02154.

Analog Systems Simulated

BROOKLYN, N.Y. — Members of the Society for the Creation of Prochronisms (SCP), a student group, have developed a recursive analog simulation package and a guide for writing Fortran IV and Basic programs to simulate analog systems on digital computers.

The guide covers a standard structure to help prevent errors, statements to simulate "all" analog functions, statements to simulate "black box" functions and data lists, and timing and handling of data to be output. SCP charges 50 cents for the guide from Sheepshead Bay Station, P.O. Box 84, 11235.

'Easytrieve' Tied to Adabas

RESTON, Va. — Users of Adabas from Software AG can now use Easytrieve from Pansophic Systems as an inquiry tool, through an interface recently developed by the Adabas vendor.

The link is supported as a regular part of Adabas on all new installations. "As with all interfaces to other packages," the coding is also free to current Adabas users, the company said from 11800 Sunrise Valley Drive, 22091.

Reliability Ideas 'Maturing': Boehm

By Don Leavitt
Of the CW Staff

REDONDO BEACH, Calif. — Things can and must be done to make software better. Awareness of that fact "is shown clearly" in the number of abstracts already submitted to the 1975 International Conference on Reliable Software, according to Dr. Barry W. Boehm of TRW Systems Group.

At the same time, the subject matter of the individual abstracts shows a maturity of thought on the basic problems "and that is very encouraging," Boehm added. As program chairman for the conference, he "fought hard for a good mix of theory and practicality and . . . won that fight."

Boehm received 156 abstracts by July 15, the announced cutoff date, and there were a "few more" dealing with tools and techniques and actual experience than with theory, he said. The original call for

papers cited five areas of interest and submissions thus far have reached across all of them.

Reliable Software Theory

Theory of reliable software as a general topic has attracted at least 13 potential authors writing about proofs of program correctness and another 13 interested in precise specification methods.

On the other end of the spectrum, testing and estimation of software reliability has evoked 19 reports of practical test tools and techniques, and another 12 practitioners answering the call for reports of practical experience.

The conference committee is open-minded about late contributions, Boehm remarked, noting "any paper with news of a technological breakthrough would be of interest even without an abstract." Such papers might even be considered

after the Oct. 1 due date, if they have an "obvious" importance, he said.

Boehm admitted it often takes years to recognize a concept as a "breakthrough" but sometimes it is more obvious. The potential of structured programming was immediately apparent, he went on, even though the basic idea has still not been implemented in many installations.

Welcome Mat Is Out

The conference toward which Boehm is pointing is sponsored by the IEEE Computer Society and Reliability Group and the Association for Computing Machinery (ACM) special interest groups on programming languages (Sigplan) and computer measurement (Sigmetrics). Now scheduled for late April 1975 in Los Angeles, it will be open to the public and will include "invited papers, tutorial presentations and panel and ad hoc discussions" as well as the contributed papers, the sponsors said.

The growth in interest in the overall subject is obvious when comparing response to this call for papers with the results of previous conferences on the same essential subject, Boehm said. He noted that a meeting sponsored by IEEE in April 1973 attracted 350 people and 30 papers. An ACM-based conference in the summer of 1972 included only 25 papers.

Returning to the mechanics of the upcoming conference, Boehm noted that with or without abstracts four copies of contributed full-text manuscripts, including all figures and references, are supposed to be submitted by Oct. 1. They should be addressed to Boehm at TRW Systems Group, One Space Park, E 1/5017, here in Redondo Beach, 90278.

Models of VS1, CICS, TSO, ASP Added to ADR's 'Sam' Simulator

PRINCETON, N.J. — Applied Data Research (ADR) has enhanced its System Analysis Machine (SAM) simulation software to include models of IBM's OS/VS1 operating system, CICS teleprocessing monitor, time-sharing option (TSO) for OS, and the Attached Support Processor (ASP).

In addition, ADR has extended SAM facilities previously released to enable the user to create "synthetic job streams." The Automatic Model Generator (AMG) builds the workload models directly from the SMF data without the hand-tuning of macro coding required up until now, ADR said.

The basic SAM language provides the 360 or 370 user with the facilities to create and modify models of systems, without any special knowledge of simulation technology. Thus the user can test various hardware/software configurations even before any new equipment is installed, ADR said.

Part of a library of predefined standard configuration elements, the OS/VS1 model enables a prospective user to compare potential throughput under various parameterizations of VS1 with current experience under MVT or MFT.

The CICS model enables current or future users to determine, in advance, the storage and CPU requirements to support a known number of users and terminals executing a given set of applications under the teleprocessing system.

The TSO model can assist in determining the factors which affect degradation of TSO and concurrent batch jobs, the impact of each additional TSO region, and the impact of increasing the number

of TSO jobs within a single region.

The ASP model is "an invaluable aid" to larger installations in evaluating the benefits of ASP's scheduling and spooling features, according to an ADR spokesman.

The updates are available without cost to current SAM users. Other users can acquire the enhanced package for a one-time fee of \$58,000 plus a \$2,500 charge for installation and training. Monthly and annual licensing plans are also available. ADR is at Route 206 Center, 08540.

Commercial Use of DEC's PDP-11 Backed By Independent Package

OKLAHOMA CITY, Okla. — DEC PDP-11 users can have an Indexed Sequential Access Method (Isam) approach to data storage, and various other system and utility capabilities, with the Commercial Facility package from Information Technology, Inc. (Infotech).

The package in its current offering is said to operate under DEC's Resource Sharing Time Sharing/Extended (RSTS/E) operating system (version 5A), and it includes a File Access Method (FAM), Screen Control Functions (Scof) and "several" utilities.

FAM is an Isam-type approach to file handling, an Infotech source said. Its features include multilevel indexing, multivolume spanning and duplicate key support, as well as placement optimization of key and index areas, and fast load

and backup.

Scof is designed for the user with CRT terminal capabilities. It allows the user to generate formatted screens and do "fill-in-the-blank" transaction processing on a time-shared basis, the vendor explained.

Programming aids that make up part of the Commercial Facility package include a capability to produce a sorted directory listing of all stored data and programs, and another that prepares alphanumeric program-variable cross-reference guides. The cross-reference might be especially useful, the spokesman suggested, for comparing use of data names or logical operations between programs.

The Commercial Facility package is licensed for use on a single CPU for \$1,500, Infotech noted from 214 N. Harvey, 73102.

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496 Kings Highway North
Cherry Hill, NJ 08034

I'm interested in more details about
Valu-Lib:

- ☐ Please send additional information
☐ Please have a salesman call

Operating System _____

Name _____

Company _____

Title _____ Phone _____

Address _____

City _____ State _____ Zip _____

At the 'Abend' of the Day...

Files Can Be Found Through Dump, Register Reviews

By Harmon R. Feig

Special to Computerworld

OS/360-370 programmers face a recurring problem in solving system interruptions involving Open, Close and End of Volume Abends.

Completion codes shown in memory dumps are some help in identifying the operation involved, but there are so many of these codes that more definitive information is needed. If the programmer can determine the particular file that was being accessed and that caused the Abend or was in core at the time of the Abend, the solution would be closer at hand.

Several methods can be utilized by the programmer to determine the "ddname." In turn, knowledge of that name leads directly to the data set or file name specified in the JCL for the step that Abended.

The simplest method of finding the ddname is to look at Register 2. This register contains the address of the Data Control Block (DCB) of the file being accessed or in core. (Incidentally, registers specified in this article are registers at entry to Abend processing.)

Prior to the core dump, the system lists all the ddnames that are used in the job. Along with the ddnames are addresses for the Unit Control Blocks (UCB), Data Extent Blocks (DEB) and DCBs (Figure 1).

If the address in Register 2 matches one of the DCB addresses in the ddname tables thus shown, one can simply determine the data set name assigned to the related ddname by checking the JCL for the particular job step. If there is no match, the discrepancy is probably due to a partial list of DCB addresses in the table, and another method must be used to find the ddname.

Tracking TIOT

The second method to find the ddname utilizes the Task Input Output Table (TIOT). The address of the TIOT, along with considerable other information, is shown as part of the Task Control Block (TCB) on the first page of output of an Abdump (Figure 2). In the TIOT itself, all the ddnames in the step that Abended are listed in the DD entry.

The offset from the TIOT origin will give the ddname associated with the DCB of the file causing the problem. If one takes the address of Register 2 (DCB address) and adds 40 (28 in hex), this will give the two-byte TIOT offset. This off-

JOBLIB	UCB 130 0008A9	DEB 03CCB4	DCB 03CF78
SYSOUT	UCB 601 0015A8	DEB 03CA2C	DCB 03CE00
SYSABEND	UCB 602 001508	DEB 03BBEC	DCB 03BCD0
SYSPRINT	UCB 607 001608		
INMSTO1	UCB 380 001B68	DEB 03C4FC	DCB 01FC74
SYS001	UCB 381 001184		
OUTMSTO1	UCB 383 001484	DEB 03BDDC	DCB 01FD20
SYS002	UCB 384 001486		
PARMFILE	UCB 130 0008A8		

Figure 1

Users can find much useful information in Abdumps, including the Data Control Block (DCB) and other addresses for each

COMPLETION CODE SYSTEM = 013
INTERRUPT AT 02056E
PSW AT ENTRY TO ABEND FF040DCD 50007A00

TCB 006320	RB	0003BC70	PIE	003BBEC0	TIOT	0003CE60
MSS	000063E8	PK/FLG	00DC5000	LLS	00000000	
FSA	0903CFB0	TCB	0005F200	PIB	E000F760	
LTC	00000000	IQE	00000000	XTCB	00000000	
STAE	00000000	TCT	00013FCB	CAR	00000000	

Figure 2

file (Figure 1), and the address of the Task Input Output Table (TIOT) (Figure 2). Figures were reset for clarity.

set, added to the TIOT address, points to the ddname sought.

A third method for finding the ddname utilizes the DEB. If Register 2 contains "garbage," the contents of Register 11, which contains the address of the DEB,

can be utilized. Adding 24 (18 in hex) to the contents of Register 11, points to the address of the DCB. With that available, the ddname can be found using the second method.

While these methods are not guaranteed

to work 100% of the time, in most cases they can be used with success. That, at least, has been our experience.

Harmon Feig is a member of the information systems staff of Western Electric, New York, N.Y.

Cosmic Package Eases IBM-CDC Data Swap

ATHENS, Ga. — Users with a need to transfer numeric data between IBM 360/370 and CDC 6000 series CPUs can get the job done with the RDUSER and WRTUSER programs in an intercomputer transfer package from Cosmic.

The transfer is done by following Nastro tape formats, which are included in the separately priced documentation, a spokesman for the clearinghouse noted.

The programs writing the transfer data to tape are machine-dependent and users should choose the package for their particular configuration, the spokesman warned. IBM 360/370 shops should utilize LAR-11633, written in Fortran IV, and CDC installations should request LAR-11634, which is largely Fortran with a small amount of Compass coding.

Each program includes approximately 1,200 card images and costs \$300, with an extra \$4 charge for documentation.

Cosmic — the Computer Software Management and Information Center — is at 112 Barrow Hall, University of Georgia, 30602.



Wholesalers Gain Basic Facts

WOBURN, Mass. — Wholesalers with access to a Basic-equipped computer system can track multiple costing and multiple pricing of any item in inventory for any customer, with the pricing information system originally developed by Atlas Paper Co. for its own use.

Atlas is currently using 10 levels or classes of items and five customer classifications. When all classification data is present, the selling price and cost of a particular item are derived by the system through a table lookup and assigned to the item at invoicing time.

If any classification data is missing, Atlas noted, the item is priced through direct reference to the inventory file.

Another routine in the new system can be used to prepare price/cost books for distribution to sales personnel and management.

The system, presently implemented on a Basic/Four system, works with inventory and customer master files similar to those found in many installations. It also requires a pricing file, a text file for the cost/price book and a file with detailed numeric input for the book.

All programs are written in Basic and can be modified to run on any machine that supports that language. The package is for sale for \$2,000 plus the cost of any tailoring required to meet users' specifications.

Atlas is at 220 Garfield Ave., 01801.

'Sides' Parameters Control Generation Of ANS Cobol Data Entry Edit Routines

ATLANTA — The Source Input Data Edit System (Sides) package from Computer Concepts Corp. (CCC) was developed "recognizing that the structure of edit programs is basically the same for all application systems," a spokesman said.

With Sides, the user avoids detailed recoding of the various aspects of editing, replacing it with parameter entries that generate ANS Cobol source code to edit any type of input data. Sides is application-independent, CCC said, and functions in either batch or on-line mode.

In a batch environment, source data can be on cards, tape or disk. In an on-line operation, input data can represent CRT screen images or keyboard entries, a spokesman said.

The parameters allow editing at all levels, including field validation and interfield, intrarecord and intragroup edits. Field validation consists of tests for blanks, numerics, ranges, and specific codes and values.

Intrarecord edits include checks for conditional relationships between fields within a record, and

intragroup edits provide the same type of checking between fields within a set or group of records, CCC noted.

Sides can handle input records in random, batched or sorted sequence. If the data is sorted, sequence checking and duplicate record detection may be specified as an option. As many as 26 different input record formats can be managed, the company added.

The system can control the rejection of records, batches or record groups, and the user can define which errors are relatively unimportant and which are critical.

Rejected records are listed on an error report with invalid fields underscored and with user-defined error messages and are also posted to a suspense file for later handling.

Within the Sides-generated edit routines, any numeric fields on the input records can be accumulated for batch balancing or control accounting. Records that finally pass all the editing tests are written to a valid data file for use by other application modules.

Sides can be used on any mainframe that has an ANS Cobol compiler. It operates on an IBM 360/30 or larger CPU and requires 45K bytes. The Sides package includes source code for the main program and two utilities.

The entire package sells for \$6,500 from CCC at 6244-A New Peachtree Road, 30340.

Fortran IV Users Get Isam Support

ANAHEIM, Calif. — Fortran IV users with direct access (Define files) on minis, mainframes or both can have a general-purpose keyed file access method with the Isam70 disk file package available from Software '70.

With a tip of its name to IBM's Indexed Sequential Access Method, Isam70 gives the user the ability to access disk records based on any alphanumeric or binary key.

Besides allowing the addition, updating and deletion of keyed records on the file, the package provides for the identification of keys on the file and the accumulation and display of operating statistics such as number of active keys, available records, file saturation, etc.

Isam70 users also have the ability to read their files sequentially without regard to the normally used keys. The keyed file may also be copied onto a new file area which may, under user control, be either larger or smaller than the original.

Isam70 is described as "extremely fast." The Software '70 spokesman reported that most read/writes for a keyed record will be accomplished in two physical disk accesses.

Isam70 is itself written in Fortran IV to be evoked as Callable subroutines from the user's application program. It can be used, the vendor claimed, on IBM 360, System/3 or 1130; DEC PDP-11; Data General Nova; or General Automation SPC-16 or 1830 machines.

It "typically" requires about 2K bytes of storage, the vendor said. The package can be obtained for a one-time lease price of \$150 from Box 3623, 92803.

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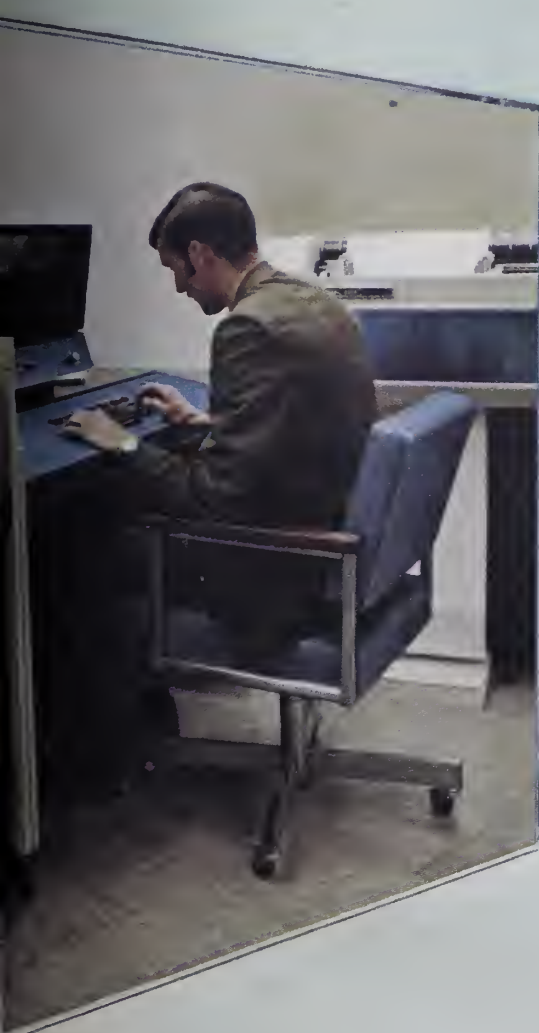
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Then each 3672 control unit connects to as many as four Model 135 and larger System/370 processors and to block multiplexer channels of large System/360 processors. Furthermore, you can switch the 3673 strings to a 370/135 IFA in addition to switching them among larger processors.

In fact, a 3673-controlled string may be connected directly to a Model 125 DDA or a Model 135 IFA, when you upgrade from IBM 2311, 2314, 3340, 3333/3330 or 3830/3330 systems on small computers.

The writable control store gives fur-

ther leeway for individual system needs and future enhancements. All significant features of current 3330 systems, from rotational position sensing to write format release, are already in, naturally.

For extra throughput, the 3670 offers faster average access times and the same fast transfer rate. For extra availability, it has the industry's most advanced drive designs and diagnostic software.

The choice of Memorex for your large computer disc storage system will be totally supported because Memorex leases, installs and maintains more drives with a higher standard of performance than any independent system manufacturer in the world.

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MEMOREX

7-City Service Could Begin Aug. 23

SP Seeks Approval for Coast-to-Coast Digital Net

By Ronald A. Frank
Of the CW Staff

SAN FRANCISCO — Southern Pacific Communications Co. (SP) has applied to the FCC for approval of the first coast-to-coast digital data transmission service.

The proposed service is similar to the AT&T plan for its Dataphone Digital Service (DDS) but the SP service will draw on the technology used in the Canadian Dataroute. Also, SP will go across the country while DDS will initially serve the East Coast to Chicago.

It is expected that the SP digital data rates will average about 10% below current voice channel rates offered by the specialized carrier and will be about 15% higher than the proposed Bell DDS service.

Initially, SP would serve seven coast-to-coast cities including San Francisco, Los Angeles, Houston, Dallas, Chicago, New York and Philadelphia. If the FCC authorizes the offering it could go into effect on Aug. 23. Initially SP had requested that it be allowed to file a one-day notice with the FCC staff for the digital service.

But the commission staff said a 30-day application would have to be filed, presumably to give carriers and other interested parties a chance to respond to the plan. The Aug. 23 effective date could put SP into the digital service area before Bell, since AT&T has agreed to postpone its DDS offering until Sept. 5 at the request of the commission.

An AT&T spokesman said his firm was studying the SP proposal and that it had not yet been determined whether Bell

would file comments on the plan with the FCC.

The digital service would offer users "paired point" city rates at speeds of 2,400-, 4,800- and 9,600 bit/sec. In addition, low-speed data rates have also been proposed for the service including speeds of 110-, 150- and 300 bit/sec. Prices would range from \$458/mo for 110 bit/sec to \$2,483/mo for 9,600 bit/sec service on a New York to San Francisco channel.

SP is probably the first specialized carrier that has pieced together a coast-to-coast network. In some areas it has combined facilities from other services but the net effect is a through transmission capability — something which the other specialized carriers have not yet done.

The SP network includes microwave facilities built by the company between San Francisco and Phoenix. Some of this route includes right-of-way transmission facilities from the Southern Pacific railroad, SP's parent company, and these are being used on an interim basis from Phoenix to San Antonio.

From San Antonio through Dallas to St. Louis, the company is using facilities established by United Video, a carrier which SP acquired. The St. Louis to Chicago to New York route utilizes channels leased from Western Union. SP will use both landlines and facilities on the newly operational Westar satellite.

From New York, the network reaches up the Empire State to Buffalo using facilities acquired from Transportation Microwave Corp. This network terminates in Jersey City, N.J., and is connected to

the New York terminus via local microwave links.

Expansions scheduled include the interconnection of a New England segment using routes established by Video Microwave, which was also acquired by SP. This route is expected to add Boston to the system by early next year. Other extensions include links to Atlanta on the former United Video routes.

Equipment which SP plans to use for the digital service includes General Datacomm digital multiplexers and Codex 8300 high-speed modems on the backbone circuits. On conventional analog local loops, SP would provide a user with a Bell-equivalent modem which would connect to a digital stream at the SP facility. This in turn would interface with a time division multiplexer system that includes forward error detection capability, and then the signal would be sent out on the system backbone.

If the local phone company provided a

digital link to the customer site, then SP would provide digital line drivers such as those available from Northern Electric and Gandalf, Inc., an SP spokesman said.

The digital service will utilize a total range of multiplexed modems from "thin route" 56 kbit/sec backbones, as utilized on the Dataroute, to 40M-60M bit/sec full digital radio systems presently becoming available to common carriers.

The initial service will essentially provide a digital representation on an analog transmission system, in much the same manner as DDS, an SP spokesman said. Later the service will be upgraded to an all-digital capability.

Other representative rates proposed by SP for the digital service include a New York to Chicago 2,400 bit/sec circuit for \$965/mo and a Los Angeles to Chicago 9,600 bit/sec channel for \$1,914/mo. Installation charges range from \$330 to \$800 depending on location and speed.

WU Begins Satellite Service

NEW YORK — Western Union (WU) has inaugurated domestic satellite service to its first customers. The service provides channels on the first satellite launched specifically to service U.S. users.

At the inaugural ceremony, a message was sent from a Trans-Lux teleprinter in New York via the Westar satellite to a similar teleprinter in Los Angeles. The transmission was sent at 132 word/min, according to a WU spokesman.

The first Westar users will use their

facilities primarily for voice, but WU plans to file a later tariff for digital transmissions.

In addition to serving users directly, WU will lease satellite capacity to both American Satellite Corp. and Southern Pacific Communications, which in turn will provide the facilities to their customers. Western Telecommunications, another specialized carrier, will also lease channels. Western Union said it had no definite date for its first data user.

A Tailored CICS—Part 2

'Middleware' Bypasses Mapping Support Package

By Patrick Ward
Of the CW Staff

LONDON — Other than reworking the operator's interface to suit its application, Computer Analysts and Programmers Ltd. (CAP) wanted to alter the systems aspects of IBM's Customer Information Control System (CICS) data communications monitor to meet the user's particular needs.

The CAP project bypassed CICS's basic mapping support package (BMS), for while CAP thought BMS would work for programs with a small number of display formats, the group felt that BMS would not be up to handling the several hundred different formats required for this application without the risk of fragmentation of store.

CAP chose to develop its own mapping system, using CICS basic terminal

support directly.

The mapping system is accessed through program macros within the application programs. These allow the different spacing requirements of the Model 1 and 2 screen sizes to be specified in a single map definition, CAP noted.

In the system, the middleware's file services interface with those provided by CICS and OS.

Indexed and serial access methods are built on top of a Basic Direct Access Method (BDAM) which itself uses CICS file services.

BDAM serves as the underlying access method for indexed files which may contain variable length records.

BDAM with fixed length blocks was chosen both for future flexibility and for better usage of existing 3330 disk

storage through RPS (Rotational Position Sensing), the report stated.

Calculations showed indexed file services required about one third of the channel time and one half the device time of ISAM, CAP noted.

But CAP's approach does not permit adding new records to an indexed file in real-time, and records cannot grow in size in real-time.

The indexed file services also support reversal, the report stated. By increasing file space requirements by about five per cent, a reversal area can be included, holding the old contents of the last record updated, within each block.

"By restricting access to a file to a single CICS thread at a time and using a change number technique, it is possible to reverse the effect of partially

completed transactions after a system crash," CAP observed.

"After a system failure... the on-line program is simply started in the normal fashion. When the first operator signs on, the restart program is executed. This scans control files to rebuild the allocation tables used by serial file services and to reverse the effects of partially completed transactions on the master files. Once it has been completed — a matter of a few seconds — each operator simply signs on in the normal way," CAP said.

The results of the CAP project are described in a report entitled "On-line Systems and Manufacturers' Software."

CAP is at CAP House, 14-15 Great James St., London, WC1N 3DY. No price was given for the 39-page report.

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System Links 11 Chain Stores To Centralize Credit Records

By Vic Farmer
Of the CW Staff

JACKSON, Mich. — Decentralized credit control means that each branch in a chain of stores maintains the credit records for its local customers. But when a customer happens to stop by at a different branch, credit authorization becomes a challenge for data communication.

And, in addition, the need to update daily the central data base of 270,000 customers sets up other constraints.

Jacobsons Stores here solved the challenge of linking its 11 Michigan stores with two leased lines and a turnkey system built by Datatrol Inc., Hudson, Mass.

The CS1500 system runs off a DEC PDP-8E minicomputer with 20K of core and two Century Data double-density 2314-type disk drives connected by a Diva controller.

A Pertec 800 bit/in., 25 in./sec tape drive provides a transaction log and audit trail for update purposes in the store's central DP center which uses NCR Century equipment.

Each store has a central controller — a Datatrol programmable minicomputer, the TP-1500 — an NCR 260 thermal printer (read only), an NCR 260 with an additional keyboard (keyboard send/receive) and a series of Datatrol RT-22 terminals.

The number of terminals runs from 15

to 46 for each store and these terminals have a 10-key numeric pad and six additional function keys.

Communications adapters are built into each central controller and were added on to the PDP-8.

Two AT&T full-duplex long lines were installed providing more than adequate capacity — 50% traffic on each line.

These two multidrop lines are divided so that one serves the four Detroit area stores and the other serves the remaining statewide stores.

There are 46 Michigan Bell four-wire lines from the adjacent stores to the credit-office stores. These lines go through the local Michigan Bell central switchboard.

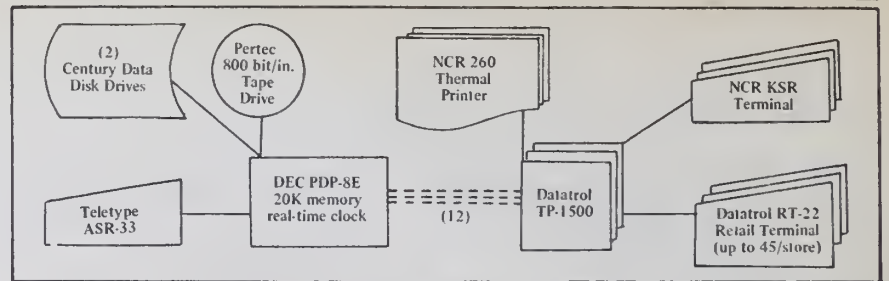
Over the telephone lines, the NCR KSR unit is used as a communications device between the Jacobsons stores. Any store can transmit a one-line message, not to exceed 80 characters, to any other store.

The KSR is also used to add accounts, modify accounts, display accounts, provide printouts of accounts in question and allow for sales audit dispatch.

This latter feature provides Jacobson's with the ability to transmit formatted reports to the stores during off-line hours.

They also use the communication facility to send flash reports to the central office from the stores and for other accounting questions in both directions.

When there is a charge transaction, the





Photographed on location at Glencoe, Scotland.

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Communications Feature Transforms Calculator Into Programmable Terminal

PALO ALTO, Calif. — Hewlett-Packard has added a data communications capability to its 9830A desktop calculator, which allows the unit to operate as a programmable terminal accessed through Basic instructions.

By adding interface cables and plug-in read-only memory (ROM) modules, the 9830 can communicate with another terminal or 9830, can operate like a binary synchronous remote batch terminal using 2780 emulation mode on-line to an IBM

360/370 mainframe, or operate as a time-sharing terminal.

The 9830 is primarily oriented toward scientific users who utilize the device for solving Fortran and other problems. But by adding an on-line programmable Basic capability, the calculator becomes a terminal input device for business and/or scientific applications, according to an HP spokesman.

When attaching the 11285A interface and the 11296B interface control ROM, the calculator/terminal can interface with RS

232 modems, automatic dialers and other communications devices. Asynchronous or synchronous data rates from 110- to 9,600 bit/sec can be supported, and the terminals can have error detection and Ascii to Ebcidic conversion features depending on the ROM modems that are installed.

Two Modes

Dual capabilities can be included so the device can operate as both a binary synchronous batch terminal and an interactive time-sharing device depending on the application.

The calculator includes a thermal printer as a built-in capability. In addition, an 80-column card reader, 200 line/min printer and disk memory with up to 10M bits of memory can be installed on the system.

According to the firm, the calculator/terminal compares favorably with available intelligent terminal systems. A typical configuration including 4K-word memory, extended I/O ROM, string variable ROM binary synchronous communications and a printer would cost about \$12,000.

If added to an installed 9830, the 11285A interface card and control ROM costs \$1,500, and prices of the other available ROMs are \$500 each. Delivery is eight weeks from 1501 Page Mill Road, 94304.

TCA User Group Organizes Unit In Southwest

BURBANK, Calif. — The Telecommunications Association (TCA), a user group, has announced the formation of a third chapter which will serve the Southwest.

Jack Gimbel of Dell Webb Corp., president of the new chapter, said this move culminates over two years of study and negotiation between communications users from the Phoenix area and the California-based TCA which presently has chapters in northern and southern California.

The new chapter is an outgrowth of a local Phoenix communications group (Atca). It will be known as the Arizona chapter and expands TCA membership to over 217 companies and 439 member representatives responsible for administering their companies' communications facilities, according to Stephan A. Ernst, TCA president.

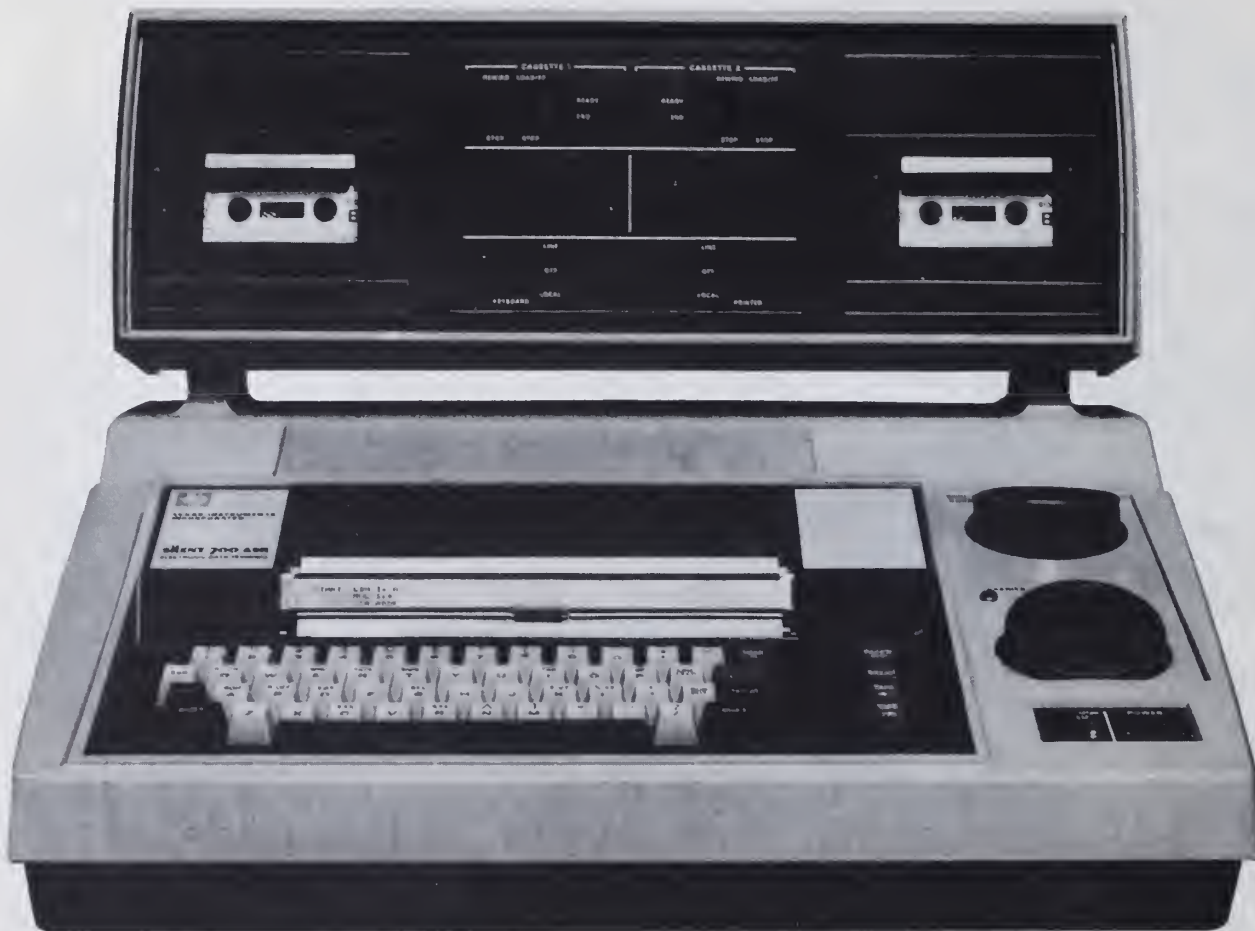
13 Years Old

TCA was founded in 1961 in Los Angeles by eight communications professionals, representing seven major companies, as a forum for exchange of experience and technical information essential to solving problems involved with management of large and complex communications networks.

The annual TCA conference will be held in San Diego Sept. 25-28.

Further information is available from TCA, Box 109, 91503.

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Same low prices start at \$2750 and basic lease rates range from \$95 to \$120 per month.

And all *Silent 700* ASR terminals feature twin magnetic tape cassettes along with quiet, non-impact printing at speeds up to 30 characters per second and offer transmission rates to 120 characters per second.

Then there's proven reliability and freedom from scheduled maintenance that cut data handling costs and maximize "up-time" for you.

And, deliveries of standard ASR models and options can be planned to meet your installation schedules... deliveries are faster than ever.

For more information on *Silent 700* ASR terminals, contact the nearest TI office listed below or contact Texas Instruments Incorporated, Digital Systems Division, P.O. Box 1444, Houston, Texas 77001, phone (713) 494-5115, extension 2126.



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TEXAS INSTRUMENTS
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Mini World

Two Line Printers Added To Data General Line

SOUTHBORO, Mass. — Data General Corp. (DG) is now offering two custom-built Data Products Corp. impact printers that give increased performance at lower prices than previously available DG equipment.

The two printers, available with either a 64-character set or a 96-character set, have lines 136 columns long and can present data at either six- or eight line/in.

The 64-character printer operates at 300 line/min, and the 96-character printer operates at 240 line/min.

The 64-character printer costs \$8,500, and the 96-character unit costs \$10,500.

Mag Tape Controllers Designed To Interface Kennedy Drives

ALTADENA, Calif. — A line of magnetic tape controllers from Kennedy Co. provides multidrive operation, formatting and control signals between Kennedy 9000/9800/9700 tape decks and minicomputers manufactured by seven companies. The units interface up to four parallel drives in any combination of 7- or 9-track tapes with speeds of 12.5- to 75 in./sec.

The tape controllers are hardware- and software-compatible with DEC PDP-8, -9, -11, -12 and -15 minis; Data General Novas; General Automation SPC-16s; the Hewlett-Packard 21XX Series, Honeywell 116, 316, 516 units; the Varian 620/73 Series; and Univac 1616, UYK-20 and UYK-15 minis.

Kennedy 9000/9800/9700 transports are 7- or 9-track read-after-write recorders with 10-1/2 in., 8-1/2 in. and 7-in. reels, respectively. Options allow use of NRZI, phase-encoded or NRZI/phase-encoded formats with 800- or 1,600 char./in. densities.

Prices range from \$4,489 to \$7,245, depending on minicomputer model, tape format and cabling required.

The firm is at 540 W. Woodbury Road, 91001.

Varian Ruggedizes the 620/L-100

IRVINE, Calif. — Varian Data Machines has produced a ruggedized version of its 620/L-100 minicomputer. The R620/L-100 is priced at \$19,500 and has hermetically sealed integrated circuits and coated and sealed circuit card assemblies.

Available in 16- or 18-bit versions, the R620 has 950 nsec cycle time, 100 basic commands, six addressing modes, up to 32K words of memory and nine hardware registers. It is also software-compatible with all Varian 620 Series minis.

Varian is at 2722 Michelson Drive, 92664.

At First IBM 3330-11 Sites

200M-Byte Drives Proving Their Worth

By Vic Farmer
Of the CW Staff

IBM began installing its 3330-11 200M byte/spindle disk drives several months ago, and for two of the first users the units are proving themselves equal in reliability to the 3330-1s, as well as nearly 25% less expensive for equal amounts of storage capacity.

Both Aetna Life & Casualty Co., Hartford, Conn., and Universal Oil Products, Evanston, Ill., reported a satisfactory conversion from the 3330-1s to the higher-performance 3330-11s.

Aetna has two 370/168s, two 370/158s, a 370/145 and a 360/65 in its main processing operation, but the company singled out its on-line teleprocessing network application for the first Model 11s.

The System by Aetna for Fast Access to Records and Information (Safari) runs on twin 3M-byte 370/168s and links 74 nationwide branches to Aetna's master file of 2.2 million automobile and homeowner policies. The network uses a total of 400 IBM and Sanders terminals.

An on-line data file of 2.2 million policies obviously consumes a lot of disk storage, and the Safari application uses a 370/168 dedicated on-line, a 168 for backup and testing, and, before the start of the conversion to the Model 11s, 150 3330-1s.

Aetna has the first 10 Model 11s installed and expects to complete conversion to 78 Model 11s by the end of the year.

Jane C. Packer has worked on the research and evaluation of the conversion and predicts the change, when completed, will save the firm over \$200,000 per year. This year, however, fixed-term penalties and the need to use new disk packs will affect the total savings.

According to Packer, the major factors Aetna considered in the conversion were:

- How to configure the minimum number of disk drives from a dollar standpoint.

- How to consolidate data sets, while taking into consideration the degree of activity on each set so that heavily used sets would not be merged onto the same pack.

"File sets have to be organized for efficiency so that we won't have contention for logical access by the users... and in some cases the data set may be more suitable for a Model 1 than a Model 11," Packer said.

In the Safari application, however, contention was no problem because the master file itself was multipindle. Packer anticipates that for applications with multiple users and small files, it will be more difficult to accurately predict cost/performance gains.

Aetna has a full-time team to handle

configuration and equipment changes and the selection process is quite "formal."

Aetna's team first identifies "prime opportunity areas" in which the proposed change would have greatest cost/performance benefit. Because of its large master and history files, Safari was ideal.

Then the firm establishes a working group which in this case consisted of members from computer research and development, operations and IBM.

The team sat down and reviewed:

- When installed 3330-1s came off lease.

- What the penalties were to return long-term leased equipment.

- What types of deliveries could be made.

The team finally calculated just how, when, where and at what price each drive could be converted. A conversion schedule was then drawn up.

Packer said the selection of Safari as the first application to convert was a difficult decision. Normally the firm would convert a noncritical application first to work out the bugs and gain familiarity with the equipment. The cost benefit to convert Safari was great enough to put aside this normal procedure, however.

Safari runs from 8 a.m. to 7 p.m. during the week and must be up at least 90% of the time. Experimenting with "unproven" equipment, therefore, called for complex testing, preplanning and scheduling.

Aetna installed the updated OS software before conversion because it wanted to be positive that the software to support the 3330-11s would in no way endanger the existing environment. This effort to check software took two weeks and a few corrections were necessary, Packer noted.

(Continued on Page 22)

Univac User Has Second Source For High-Speed Drum Printers

LONG BEACH, Calif. — Users of Univac's 418 III, 494 and 1100 Series computers have the option of getting Macro Products Corp.'s plug-compatible M470U drum printer.

The use of 36 consecutive characters on the 64-character print drum yields a print speed of 1,800 line/min. Printing the entire 64-character set yields a print speed of 1,200 line/min.

At these speeds, the printer delivers a full 132-column format and can handle up to six-part forms. Horizontal and vertical alignment is simplified through paper guides that permit fine adjustment even while printing, according to the firm.

A quick-change drum option is available, allowing the operator to exchange the character drum. The M470U printer is equipped with a 12-channel vertical format tape unit for vertical format control. A tape control decode card in the printer makes the vertical tape unit compatible with the four-channel, 15-position Univac tape control unit.

In all cases, the printer system connects to a normal or compatible channel of a CPU, an I/O channel of an I/O controller or a shared peripheral interface channel. The Macro controller controls either one or two printers in either a single or double interrupt mode.

The controller unit has a built-in maintenance panel and self-test logic that simulates all of the CPU printer functions. The maintenance panel is designed to help a service engineer maintain the printer system and to troubleshoot the printer and controller in a self-test mode,

without the processor or special external test equipment, the company said.

The M470U can be ordered as the single printer system at \$46,700 or as the dual printer system at \$83,800. If an upgrade is desired at a later date, the system can be field-converted to add a second printer at \$40,200. Three- and five-year leases are available.

Macro Products is at 3110 E. Willow St., 90806.



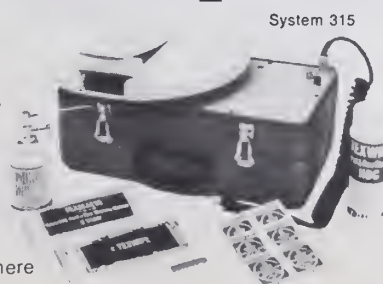
Overweight?

Yes, it's a real Pelouze... punch card counter for \$29.95. Called the Y-Tab Card Counter, the scale quickly counts any quantity up to 1,000 80- or 90-column cards by weight and to within $\pm 1/2\%$. The Pelouze Scale Co. is at 1218 Chicago Ave., Evanston, Ill. 60202.

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Lightweight, portable and available immediately, the System 315 handles all disc cartridges and the System 652 handles all standard disc packs. Both these motorized instruments are safe, efficient, and thorough, and each operates independently for off-line cleaning—anywhere. Each is a proven success, and many are in active use both here and abroad. Send today for this booklet which describes the complete line of Texwipe cleaning and inspection instruments.



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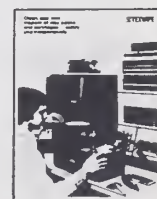
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As Reliable as 3330-1

First IBM 3330-11 Users Saving 25% in Storage Costs

(Continued from Page 19)

The 3330-11 OS updates obviously were not even functional because the system was still using only Model 1s during the software test, "but we found out in the past that when you make changes, something that is supposed to work may not work, or it will work but also degrade the system," she said.

After the OS software was straightened out, Aetna spent a week and a half using the updated OS before it scheduled the first weekend 3330-11 conversion.

"We ran two schedules in parallel. If the Model 11s didn't work we would always be able to revert to Model 1 operation," Packer said.

After 10 units were installed, the company monitored error recording and compared the results against the statistics it had accumulated for the Model 1.

Aetna's requirement was that the Model 11s would be at least as reliable and be up

as much as the Model 1s.

"In general, reliability is equal... We had a couple of problems with the Model 11s we had not experienced with the Model 1s, but we attributed them to the burn-in period as the problems were unusual... We are still monitoring the condition, however, to see if it recurs," Packer said.

Aetna makes it a policy not to accept a product until after a four-week period in which the equipment meets expected standards. "We pay for the equipment during the test unless it doesn't work," explained Packer.

To make sure the test would not be complicated, Aetna used IBM packs during the test period, but it is acquiring Nashua packs now that the test period is just about finished. Aetna was offered time at a test site but the only 370 available was a 158 and the firm didn't want to generate a whole new OS.

Meanwhile, Universal's DP department uses a 2M-byte 370/158 working mostly on remote job entry applications with 20 sites on-line.

Universal is planning to go to a multi-processor or 158 with 20 Model 11s within a year. Of the 12 3330 drives installed, six are Model 1s and six are Model 11s.

Dennis Watts, who is presently involved in the selection and investigation of hardware for the firm, reported only a one-day problem because the firm started using a program temporary fix before the OS update came through.

After that, Watts categorized the operation of the Model 11s as "outstanding." And they cost 25% less than the Model 1s, he noted.

Universal had no worries about file contention because much of the firm's processing is heavily Fortran-oriented to handle scientific and engineering problems,

Watts said.

Thirty hours were allowed for the conversion and, including software fixes, the firm was able to finish conversion just under the wire.

Microfiche Terminals Aid Spain's Operators In Phone Lookups

MADRID — Spain's directory assistance telephone operators no longer thumb through phone books searching for numbers, thanks to the Automated Directory Assistance System (Adas) developed by Image Systems, Inc. Adas is a microfiche information retrieval system which uses Varian 620L minicomputers to achieve a 50% reduction in the average time spent by operators on a single call.

Compania Telefonica Nacional de Espana (CTNE) provides telephone service for Spain's 50 provinces. Each provincial capital city has a directory assistance office with three to 100 operators — several thousand in the whole country.

Adas equips every operator with a microfiche terminal which can access any listed telephone number in the country within four seconds. Each terminal can hold a maximum of 750 microfiche cards (27 million telephone listings).

In CTNE's system, remote terminals are tied by dedicated telephone lines to one of four Varian 620/L-100 computers. All the indexing information needed to access the microfiche cards is contained within the computer's 500K-word disk.

Newspaper Unit Links OCR, CRT, Mini, Disk

BEDFORD, Mass. — A turnkey system from ECRM, Inc. combining CRT terminal, OCR reader, minicomputer and disk memory can handle a newspaper's classified and editorial copy.

The Auto-Class 5600/5700 allows its operator to proof, edit and modify stored documents at will.

Output can be paper tape or on-line to the newspaper's typesetting equipment.

Additionally, the system picks up billing information from the classified ad order forms that are fed into it and can output that billing information directly to the newspaper's DP center for the printing and mailing of bills.

When the newspaper's deadline approaches, the processor can also sort and alphabetize the ads. Real estate ads by town are only one example of this sorting feature.

The Auto-Class 5600 costs \$69,500, and the 5700 with a higher-speed scanner costs \$77,500.

ECRM is at 205 Burlington Road, 01730.

Printec-100 Now for HP 2100s

WOBURN, Mass. — Printer Technology, Inc. has interfaced its Printec-100 serial impact printer to the Hewlett-Packard 2100 minicomputer.

The 2100 printer package includes interface board, 15-ft interconnect cable and supporting software. Machines with 64-character fonts print 132-column lines at 35 line/min.

The interface is an eight-bit parallel card which supplies the hardware control necessary to operate the printer while monitoring status information for the software operating system, the firm said.

As an additional feature, the controller card can be modified so that both the HP tape reader and punch can be run off the printer controller card. This option costs an additional \$350. The 2100 printer package costs \$5,400 from Sixth Road, Woburn Industrial Park, 01801.

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Scanner, Mini Combined in Inventory, Shipping System

By Edith Holmes
Of the CW Staff

ASHLAND, Ohio — Located along a conveyor system and linked to a mini-computer, an optical scanner helps send sporting goods to storage or to shipping at the Eagle Rubber Co. plant here.

In addition to putting the plant on automatic routing, the scanner, interfaced to a DEC PDP-8 with 16K, provides the rubber company with inventory and shipping information on all products entering and leaving the facility, a company spokesman said.

Installed in February 1973 by Accu-Sort Systems, Inc., Sellersville, Pa., the scanner-computer system reads the decimal bar-coded label on the box of each finished product. Depending on the sequence of numbers on the box, the product is routed into storage or to shipping, the spokesman explained.

He said the system yields a permanent record of inventory and turnover information as well as volume and type of products shipped.

The rubber company plans to add another scanner to separate shipping from

storage routing due to jamming problems caused by the slow speed of its conveyor belt, the spokesman added.

Other Systems

Accu-Sort Systems has linked scanners to computers at approximately 18 companies, according to an Accu-Sort spokesman. The scanners can be connected to almost any mini, in serial or in parallel, up to 9,600 bit/sec, he added.

And the scanners have already been tied into PDP-8s, PDP-11s and small Honeywell and Hewlett-Packard machines.

Plans are under way to perform still another scanner-computer linkup at a Black & Decker plant producing power tools in Tarboro, N.C.

When the plant was built in 1970, Black & Decker constructed an intricate conveyor system which surrounded the manufacturing and assembly area. The concept behind the system was the direction of parts to six different assembly lines as quickly as possible.

Along the way to these assembly lines, some of the parts had to be painted, machined or molded before they could be assembled, he added. After the parts were used, the tote trays had to be returned to their point of origin for reuse.

To handle routing problems, Black & Decker purchased 14 Model 421 optical scanners from Accu-Sort Systems. The scanners' single enclosure fit the needs of Black & Decker engineers.

Installed in plant two years ago, the scanners have helped to turn inventory at a higher volume, the spokesman commented. He anticipates that the need for more complete DP information will result in a connection between the scanners and a computer in the near future.

Because they can identify a piece from its entry into the assembly line to its exit as part of a finished product, the Accu-Sort spokesman expects scanner-computer systems to lead to "the intelligent factory."

On-Line COM Saves Money, Time

CLEVELAND — Bancsystems Association reduced the time required to produce daily computer-output-microfilm (COM) reports 67% while reducing COM equipment rental 73% when it converted from off-line to on-line COM.

The association, which is owned by and serves as the DP center for 190 Master Charge banks in this state, replaced a tape-driven COM unit with a Memorex 1600 COM on-line to its IBM 360/65 last year.

"In addition to time-saving and rental advantages, we gained some unexpected operational efficiencies with the Memorex equipment," stated Bob LaHair, president of Bancsystems.

Specifically cited was the fixed forms flash method of superimposing report headings on film through a separate lens to preclude programming and storing headings as data. The former machine required time-consuming manual realignment of the forms set upon changing both magnetic tape reels and reports.

Microfilms Statements

Bancsystems microfilms statements and trial balance records for approximately one million Master Charge cardholders. Statements are microfilmed on a daily cycle basis. A full trial balance is microfilmed for all one million accounts monthly. An active trial balance for approximately 750,000 accounts is filmed three times each month.

In addition, negative trial balances are microfilmed daily. The records are microfilmed for retention purposes and for inquiry backup to credit authorization requests from merchant members in the event computer or communication equipment downtime precludes on-line inquiries.

The association, which owns its computer, is not faced with extra shift rentals. One of the eight partitions of its 360/65 multiprocessor is dedicated to COM operations six out of a total of 24 daily computer operating hours.

Tab Card-Size Cassettes

Microfilm in the form of tab card-size cassettes is stored at Bancsystems in Cleveland and member Master Charge banks. The cassettes require only 2% of the storage space of their hard-copy equivalents.

Key to the COM system is the 1603 microfilm printer, an on-line device which operates as a standard peripheral and is able to print 132-character lines directly on microfilm at rates of up to 10,000 line/min — 10 times faster than standard impact printers.

The 1603 achieves these speeds by employing fiber optics to transmit digital signals directly from the computer into

Indicator Signals S/3 Halts

CLEVELAND — The Sentry/3 from Computer Resources, Inc. provides IBM System/3 users with an indicator to signal program halts and end-of-job stops.

The unit provides an adjustable volume control and a flashing light when the CPU stops. Requiring no external power, the unit can be unplugged from the CPU for maintenance.

The Sentry/3 is priced at \$139.50 from the firm at 4650 W. 160th St., 44135.

alphanumerics.

The system operates by exposing a magazine loaded with a 500-foot roll of 16mm film (the equivalent of 12,000 pages of fanfold printout paper). The film is processed automatically in a special developer unit, then loaded into cassettes.



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Because all disk packs conform to certain industry standards, you might think they're all equal. They aren't. The important difference is the extent to which a manufacturer is willing to go in order to exceed industry standards. It's a matter of making a disk pack better than you really need, because there could be times when you need it. Let's look at a few superior points of the BASF 1236 disk pack:

The binder that won't quit

As you probably know, magnetic coating doesn't stick to the aluminum disk all by itself. We use a special binding agent to produce an incredibly strong bond. The disk is sealed to prevent oxidation, so you can be sure that the coating won't peel or flake off.

Our own coating process

As the trend toward higher packing densities continues, it becomes increasingly important to monitor the thickness of coating deposited on the disk. The problem is compounded by the necessity for progressively varying the coating thickness from the outside toward the inside of the disk, because packing density is greater as the

circumference decreases. For those reasons, we've discarded conventional coating methods in favor of an exclusive process using our own BASF-designed equipment.

A polished performance

Following the coating operation, we use our own exclusive polishing process to achieve optimum surface regularity. We've been able to achieve a surface so flat that the possibility of a head crash caused by uneven disks is completely eliminated. We might mention here that the coating and binder formulation, combined with coating and polishing techniques, all are important factors in achieving surface hardness, which is the ability of the coated surface to survive excessive or extended head loading.

Achieving balance

Like any rapidly rotating object, a disk pack will behave strangely if not perfectly balanced. In our precision balancing operation, any weighting required is screwed into place, which eliminates the potential of shifting inherent in a conventional adhesive weighting system.

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World-wide sales passed 50 during 1973. Users range from a company with 300 employees and a 370/145 to large cities, banks, and insurance companies with very powerful computing capacity. Users include those switching from IMS, TOTAL, and S2000 to ADABAS.

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Sound Sensor Linked to Mini Helps Identify Heart Defects

SCHENECTADY, N.Y. — A minicomputer with a small electronic sound sensor is being used by researchers to identify heart defects that can escape detection during routine examinations.

Similar in principle to the stethoscope, the technique is designed to provide physicians with a broader, more accurate range of heart sounds, each computer-analyzed for interpretation and diagnosis, according to a spokesman for General Electric, the developer of the device.

An electronic sensor about the size of a silver dollar is placed directly on the patient's chest, the GE representative explained. The sensor detects sounds in the frequency range of one- to 1,500 cycle/sec, compared with the 30- to 500 cycle/sec normally picked up with an ordinary stethoscope.

Digits to Diagnosis

Converted to digital signals, the sounds are then fed into a DEC PDP-11/40 and analyzed, he said. Once the results have been printed out, the physician interprets the data and makes a diagnosis.

GE officials contend the technique will help eliminate many of the variables that can produce inconclusive findings. For example, the pressure with which a stethoscope is placed against the patient's chest can affect the heart sound, but the sensor rests on the patient at a constant pressure, they said.

In tests at four major teaching hospitals and at GE's Industrial Clinic here, the spokesman claimed the technique successfully detected restricted blood flow, abnormal muscle contraction, arterial blockage and the very early stages of weaken-

ing heart valves.

Developed at the General Electric Research and Development Center here, the method is intended to supplement rather than replace the familiar electrocardiograph (ECG). He added the company expects the technique to be clinically qualified and ready for wide-scale use in two to five years.

Evaluates Severity

Should a serious heart ailment be detected, the technique can be used to evaluate its severity. The spokesman said this procedure could reduce the need for complicated catheterization procedures that require the injection of chemicals through tubes inserted into the heart.

When combined with ECG tests at the clinic, the "phonocardiic" tests measured mechanical functions such as valve opening and closing, muscle contraction and the flow of blood into and out of the heart. The spokesman said this information supplemented ECG readings measuring heart rhythm and conduction.

GE researchers expect this technique will be applied within the next five years to such areas as postoperative diagnostics, continuous monitoring of heart patients and mass physical examinations.

The phonocardiology method is a spin-off of "acoustical signature analysis" studies at the GE center here, where sound signatures have been used to pinpoint engine malfunctions, locate loose parts in sealed assemblies and predict failure of artificial hearts and aortic balloons implanted in animals, the spokesman noted.

Program Determines Lesion Site During Stereotactic Neurosurgery

Special to Computerworld

TORONTO, Ont. — Scientists at the University of Toronto's computing center in cooperation with the Toronto General Hospital have developed a new computer program that can assist a neurosurgeon in the operating room.

The idea was conceived by Dr. Ian Rowe, associate professor in the Department of Electrical Engineering.

The program, called Computerized Data Processing System for Stereotactic Neurosurgery, is used by Dr. R. Tasker at Toronto General Hospital for this type of surgery where a mechanically directed probe is introduced into the brain through a small hole in the skull. The technique is used for the control of tremors and for the relief of pain.

The problem however has been that the target site of the probe could not be seen by the surgeon.

Under local anesthesia, the probe is advanced by small increments toward the tentative site. The surgeon determines its position in the brain by passing weak electrical pulses which elicit a response in the patient's body. The site and nature of the response is related to the location of the probe.

60 Stimulation Sites

Since the probe may pass through 60 stimulation sites with up to five responses at each, the surgeon has to interpret and act on this mass of data. Rowe determined that this information could be taken from the operating room via a portable computer terminal.

The program for the project was written in APL by P. Hawrylshyn and the data is transformed into a graphical output which shows the section of the brain and the trajectories of the stimulated responses evoked in various body areas.

Results are printed out in less than 10 seconds and from the map the surgeon

can choose the final site for making a lesion.

The portable terminal is linked to the main computer by telephone and the surgeons envisage that a surgeon working in Texas, for example, could use the program originating in Toronto during his operation.

Rowe and Tasker plan to examine all the previous records of stereotactic neurosurgical operations with the computer program and hope to create a data bank that will provide information to assist future operations.

Think Before Retiring To the Academic Life

NEW YORK — Thinking of abandoning the business data processing rat race and retiring to a quiet college as a teacher?

Computer Personnel, the quarterly publication of the Association for Computing Machinery (ACM) special interest group on computer personnel research, just surveyed computer science faculty salaries over the 1973-74 school year and came up with these results:

Non-Ph.D. appointments (Median Salary Range)

Instructor: \$10,100 to \$11,400
Assistant Professor: \$11,600 to \$12,200
Associate Professor: \$14,000 to \$16,000
Professor: \$19,000 to \$26,000

Ph.D. appointments (Median Salary Range)

Assistant Professor: \$13,000 to \$15,000
Associate Professor: \$15,900 to \$17,800
Professor: \$21,500 to \$24,500

These figures are not starting figures, the publication noted.

Using Computer-Generated Images

Pilots Trained for Nighttime Conditions

SAN DIEGO, Calif. — Pacific Southwest Airlines (PSA) is showing its pilot trainees what it is like to make nighttime takeoffs and landings at eight California airports — without the trainees ever leaving the ground.

The airline's Virtual Image Take-off and Landing (Vital II) visual display system is the first such training system to use computer generated images, rather than film or TV screens, according to Mike Rubin, the airline's flight simulator assistant maintenance supervisor.

Buick Motor Division Boiler System Not Just Lots of Hot Air

FLINT, Mich. — At the Buick Motor Division's plant here, where vast amounts of steam are needed not only for heating and cooling buildings but also for washing auto parts and heating paint, the company has installed a new steam generating system controlled by a Honeywell 316 computer.

Calling it a "first" in the automotive field, Don Naish, environmental control superintendent and the man in charge of the powerhouse operation, said the new system "simplifies a complex job considerably, bringing all 2,700 pairs of wires into the panel so you can troubleshoot practically anything from that point. The old boiler systems needed men standing by the telephones," Naish said.

The new powerhouse at the Buick complex consists of two multifuel, tangentially fired boilers with a maximum continuous rating of 400,000 pound/hr.

A digital computer control system operates the two boilers. The control system consists of a Honeywell 316 computer with a core memory of 20K words, a real-time interface unit to connect the computer with the keyboard, displays and typewriters.

Acquisition, Logging

The system utilizes Honeywell Vupak software, according to Naish, supplemented by application-oriented programs for performing special tasks. The operating system provides data acquisition, logging, alarming and direct digital control.

A unique feature is the ability to configure data acquisition and control loops on-line from the main control panel, using the computer keyboard and display units. Special programs provide a sequence-of-events log and efficiency calculations, Naish explained.

Analog inputs from the process to the computer are primarily temperatures, pressures, flows and levels.

"Two typewriters print out boiler operating conditions," Naish explained. "One, for exception reporting, indicates when process variables reach unsafe conditions and then reports return-to-normal information. This typewriter also records actions demanded through the operator's console.

"We can make on-line changes of various control parameters right from the console," he said.

The other typewriter is for logging, he explained. Individual process variables are assigned through the console to any of seven log groups. The logging typewriter is set up to log on an hourly basis, but logs can be demanded from the console at any time.

Honeywell supplied a burner management system which is completely separate from the computer except for alarms, according to Naish. "It utilizes dynamic self-check flame safeguard components to monitor the presence of individual pulverized coal-fired flames and shuts the system down if three of four burners go off," Naish said.

The system allows trainees to practice many maneuvers that could previously be done only in actual flight, thus reducing the hazards and costs of pilot training, PSA officials noted.

McDonnell Douglas Electronics Co. developed Vital II in conjunction with PSA, and the first operating Vital II was installed at PSA's headquarters here in February, Rubin added.

A 16K Varian 620F-100 computer keeps track of the simulated aircraft's position, course and speed, and also governs the physical movements of the practice cockpit and computes the readings on its instruments.

Another Varian 620 takes position and altitude data from the first CPU and uses this to create an appropriate airport view in the simulator.

The system uses programs on lighting around eight real California airports and

one generalized example to generate a three-color image on two CRTs.

Inside the simulator, teacher and trainee see reflections of the CRT displays through a mirror system that keeps the image's perspective regardless of the occupant's angle of vision, Rubin stated.

What they see is a close duplication of a real night scene, he said, "particularly the approach lighting, the runway lights, the taxiways," plus illumination representing the major streets in the area.

The system shows flashing beacons, but no other moving planes, Rubin added.

The \$300,000 Vital II system can take a pilot through instrument takeoffs and landings, missed approaches, mechanical problems, crosswinds and terrain effects, according to PSA. The system can even render the consequences of an engine's falling off during takeoff or landing from the safety of the ground, PSA noted.

Logs Logged On System/3

MEDFORD, Ore. — A company here is logging its logs into a computer — timber logs, that is.

The Medford Corp. (Medco), lumber and plywood manufacturer, uses the computer to help keep track of the forest products it makes each year — enough plywood for about 20,000 houses and lumber for 9,500.

The running inventory is kept on an IBM System/3 Model 10, which also runs payroll and accounting.

The company operates its own 87,000-acre tree farm from which it gets the 200,000 trees it processes annually.

Medco also buys trees from the Federal Government by competitive bid. After a company forester inventories a tract of standing timber, his report is processed by the computer, enabling Medco to calculate the tract's present and future value.

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Senate Warned IBM May Be Monopoly in Other Areas

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — IBM could eliminate competition in semiconductor technology and domestic satellite communications as the company did in the peripheral equipment industry, a security analyst and an independent display terminal manufacturer told Sen. Philip A. Hart's (D-Mich.) Subcommittee on Antitrust and Monopoly here.

By undercutting the financial and technological bases of rival companies, IBM is likely to build strongholds in the next generation of DP systems, according to Marilyn Walter-Carlson, vice-president and associate director of research for Shareholders Management Co., and Royden C. Sanders Jr., president of Sanders Associates, Inc.

Sanders drew a parallel between the laws and rulings that could result from current hearings and court decisions and Justice Department litigation begun in 1952 and concluded in 1956.

The antitrust consent order resulting from that case controlled IBM's tab card activities, but did not impede the company's switch into the next generation of information handling — electronic data processing, he said.

He cautioned that any government move to limit IBM's influence in the industry would have to take the company's interest in developing fields into account.

In particular, Sanders is concerned with IBM's announcement on July 3, 1974 of plans to enter the domestic satellite business through acquisition of 55% of CML Satellite Corporation.

Satellite communications systems have the potential of becoming the least expensive method of communications between computers, remote terminals and other business devices, he said.

"Although IBM will not control the only satellite communications system, it alone will possess the resources to control the \$110 billion domestic market that

encompasses business equipment, data processing and business communications — the total market for integrated business systems," Sanders added.

In Sanders' view, the emerging business systems communications market presents the same opportunities for predatory practices on a larger scale that IBM used to reclaim the peripheral equipment market from independent manufacturers.

As in the case of peripherals, Sanders claimed, "IBM has every motivation to influence the design of the satellite network in such a way that it can be utilized

for IBM's massive return to the computer services market."

He cautioned those who believe IBM's entry into the communications business might be beneficial because IBM represents the first technically competent, well-financed organization to compete with the Bell system.

"The confrontation of these two giants will lead to a division of the market along noncompeting service lines, and the abatement of such competition will make losers of the customers and the public,"

(Continued on Page 33)

Capital: Monopoly Cause or Effect?

By a CW Staff Writer

WASHINGTON, D.C. — Is IBM doing something illegal to preserve its present rate of return or is the company simply a superior performer?

These basic economic issues faced the Subcommittee on Antitrust and Monopoly, chaired by Sen. Philip A. Hart (D-Mich.), as it listened to testimony from two economists and a security analyst.

"At present we don't have anything resembling sufficient evidence to support either one of these valid hypotheses for explaining superior performance evidenced by IBM's share of the market and rate of return," commented Dr. Michael

Granfield, chief minority economist for the subcommittee.

But until IBM presents its case either to the subcommittee or during one of its several court engagements, it is unlikely that economic issues will be clarified, according to the statements of economists Ralph E. Miller and Gerald Brock and the testimony of Wall Street security analyst Eugene K. Collins.

All three estimated IBM's share of the market at between 65% and 75%. IBM, however, computed its market share at 35.1% for 1970.

Using IBM's definition of the market, American Telephone and Telegraph, which makes no general-purpose computers, became the second largest "computer industry" participant, commented Brock, assistant professor of economics at the University of Arizona.

Miller defined the external forces affecting market shares as the markets for computer time, used computers, programming services and other assistance in the use of computers, the influence of user organizations and finally, the increased debugging of the software for a widely used computer system.

Looking at IBM's dominance from the point of view of a new firm entering the market, Brock defined three barriers to entry: economies of scale, brand loyalty and raising capital.

Characterizing barriers as "anything which makes it difficult or impossible for

a new firm to enter the industry," Brock said all three problems pose a much greater threat to firms attempting to enter or remain in the integrated systems portion of the market than companies that manufacture at the subsystem level, he said.

"Capital requirements for entry into the integrated systems business are huge," Brock said.

Collins concurred, commenting that "the ability to raise capital has become an unusually important factor in the general-purpose computer industry due to IBM's practice of marketing a total bundled computer system on a rental basis."

Until the break-even point is reached, increased shipments on a rental basis mean increasing losses, added Collins, director of research for Evans & Co., a New York stock brokerage firm.

He noted the problem from a financial point of view is enormous.

"An investor is being asked to commit capital to a business that may not show a profit for perhaps as long as 10 years..." in an industry sensitive to the perils of economic downturns and product obsolescence.

IBM's reaction to the competition generated by the plug compatible manufacturers served notice "to Wall Street that competition on a subsystem level had little chance of success," he said. "Wall Street listened, and the capital barrier to entry into the market was reaffirmed."

Greatest Growth Yet to Come In DP Industry, Experts Say

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. — Hard market data is missing in the computer industry because manufacturers, for several reasons, refuse to release shipment and market share data, market researchers agreed here in testimony before Sen. Philip A. Hart's (D-Mich.) Subcommittee on Antitrust and Monopoly.

However, researchers from both International Data Corp. (IDC) and Auerbach Associates, Inc. agreed that the greatest growth in the computer industry lies in the future.

In the next five years the installed base of computer equipment will grow from the 133,000 units installed at the end of 1973 to around 481,000 installed units, according to Jim Peacock, Editor of *EDP Industry Report*, published by IDC.

Value Will Increase

At the same time, the value of the installed units will increase from \$29.9 billion to \$50.4 billion, he said, noting that much of the growth in units installed will come in the minicomputer area.

This future growth will be more dramatic than any past growth, he indicated.

At the same time, Peacock told the senators that most of the equipment installed is on a rental basis which requires computer manufacturers to find sources for large amounts of equity financing.

In the U.S., he said, IBM equipment accounted for about three fifths of the installed base. Of the IBM total, about 5% of the equipment was pre-360, about 13% was small systems, approximately 32% was 360 equipment and 43% was 370 equipment at the end of 1973, he said.

The IDC figures show, Peacock indicated, that IBM also accounts for about three fifths of the worldwide installed base of computer systems.

In addition, while U.S. computer users have about 55% of the computer installa-

tions in the world, U.S. manufacturers account for about 90% of the computers installed around the world, he said.

At the same time, Peacock continued, services are growing as a percentage of overall user spending and they represent an alternative way for many users to get computing power. In the future, services and support could be expected to grow even more, he said.

Peacock stated careful study is required before any recommendations should be made that might affect the future of the computer industry, which he said is young and growing.

"I often think," he said, "that the whole thing will work out in the future," without government regulation or court-ordered restructuring of the industry.

Robert E. Wallace, a district vice-president with Auerbach, agreed generally with the IDC market figures and indicated that computers are an important component of the U.S. economy even though less than 1% of businesses currently use such equipment.

Because of this, he said, there is a great deal of growth left in the area, particularly in light of predictions indicating that computers may well be used in the home in the future.

The computer industry, he said, demonstrates more cooperation between user and manufacturer than any other industry. This is largely because of influence from the punched card equipment days.

Therefore, everyone who wishes to compete in the business must offer both products and services to the users, Wallace said, adding that users place a great deal of importance on the "charisma" of their suppliers.

Because of this a manufacturer needs to have large financial resources for the necessary research and development in hardware and software and a large installed base of users over which to spread service costs, he said.

IBM to Pay Ampex \$13 Million

NEW YORK — IBM has agreed to pay Ampex Corp. \$13 million to settle a patent infringement and antitrust "dispute" with the firm.

Ampex had alleged IBM infringed its tape and disk patents and violated antitrust law in the marketing of peripheral equipment and memory products.

The dispute was never taken to court. "Ampex never said it was considering a suit. It was private matter between two companies," an Ampex spokesman said.

The two companies also agreed to an exchange of patent licenses. The agreement covers "present and future information handling products, including all peripherals and memory products and TV-related products as they pertain to the business of Ampex and IBM," the spokesman said.

IBM noted that this settlement was an isolated occurrence. However, industry sources commented that several other companies are currently negotiating settlements with IBM in lieu of antitrust action.

In a joint statement, Ampex President Arthur H. Hausman and Frank T. Cary, IBM chairman, said, "We are pleased this agreement has succeeded in avoiding time-consuming and costly litigation over

the issues of patents and antitrust. Because of this, and because of the exchange of licenses that will result, we believe that both companies will benefit."

Ampex was one of several smaller computer equipment manufacturers expected to consider antitrust suits against IBM following IBM's loss of a \$259.5 million suit to Telex Corp. last year.

Arthur Watson Dies

NORWALK, Conn. — Arthur K. Watson, former chairman of the IBM World Trade Corp., died last week after an accident in his home. Watson was 55.

Son of the late Thomas J. Watson Sr., Watson assisted in the establishment of the subsidiary World Trade Corp. and supervised its growth. When founded in 1949, the firm had sales of less than \$50 million outside the U.S. When he resigned as chairman of the board of World Trade to become U.S. Ambassador to France in 1970, World Trade's sales were in excess of \$2.5 billion.

Watson also held posts as vice-chairman and director of IBM.

He was a staunch supporter of "freer" trade and served on several government and private committees.

In the June 26th issue of Computerworld, perhaps you read "how well-set career paths, based on a unique skills inventory, have resulted in Manufacturers Hanover Trust Company rarely losing a good DP person for the wrong reason."

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Growth in Minicomputer Usage Foreseen for Japanese Market

By Marvin Smalheiser
CW West Coast Bureau

CUPERTINO, Calif. — A tremendous opportunity for growth in minicomputer usage exists today in Japan, according to Ed McCracken, marketing manager for Hewlett-Packard (HP) Data Systems.

The opportunity stems largely from a need to increase productivity in the face of a rising wage rate, he explained.

McCracken, who just returned from a visit to Japan regarding HP's own minicomputer effort there, also said the growth of minis there has lagged slightly compared with the minicomputer market in the U.S.

"The growth there will be faster than the other minicomputer markets in the next few years," McCracken said.

Still, computer usage in Japan is very much like usage in the U.S., he noted.

"I expected there would be much more of a difference between the U.S. market and the Japanese market.

"Perhaps because minicomputer usage started a little later in Japan, the applications are growing more rapidly than in the U.S.," McCracken said.

Most of the applications, McCracken said, are in the scientific area with process control usage second.

"Scientific users are extremely skilled in applying minis to scientific problems," he said.

"There is no major skill difference between Japanese users and U.S. users.

"They are getting in large networks, real-time. There are a lot of trained computer scientists and engineers. Their skills are very high."

McCracken said each of the major computer companies operating in Japan has minis for use in business applications in models that are competitive with IBM's System/3.



McCracken

Large networks of minis communicating to a central data base on a large computer are just starting in Japan, he said.

"Japanese telecommunication networks are pretty good. There is a lot of future potential for telecommunications and data communications systems."

McCracken was in Japan to get an update on the market and to meet with officials of Yokagaya Electric Works (YEW).

HP has a joint venture with YEW for the manufacture of HP minicomputers.

The energy crisis and inflation have disrupted the economy in a way that has slowed down capital expenditures for minis, McCracken said.

But the joint venture firm, Yokagaya Hewlett-Packard, is substantially over its target for minicomputer sales for fiscal 1974, which ends Oct. 1, he added.

Although the economy is a question now in Japan, McCracken said "it seems to have stabilized. There is a lot of hope for a better 1975."

Rising wage rates in Japan are no longer out of balance with those in the U.S., he said.

"This means there are now the same trade-offs in labor costs and the use of automation.

"There should be a much bigger market for minis as a result," McCracken added.

He expects more opportunities for U.S. manufacturers to get into the Japanese market.

Within a year Japan will lift many of the restrictions on importing minis. This will make it easier for new mini manufacturers to market there, McCracken said.

Prices for minis in Japan are very competitive with U.S. minicomputer prices, he said.

Japanese minicomputers, he mentioned, can make an impact on the world market.

They are made by large companies with aggressive marketing which can invest in developing world markets with price and market strength.

But McCracken said he doesn't think any Japanese company has a lead over U.S. companies in technology.

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CIA, CDC Offer IBM Restructuring Plans to Senate

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — "Our current laws appear incapable of solving the problem of restructuring IBM," Dan L. McGurk, president of the Computer Industry Association (CIA), recently cautioned Sen. Philip A. Hart's (D-Mich.) Subcommittee on Antitrust and Monopoly.

Offering his approach in addition to a plan from Control Data Corp., McGurk noted, "From the few instances in which a solution has been found through restructuring or divestiture, we must assume that our present system is much less able to deal with any solution other than regulation."

He further charged existing laws fail to define precisely what it means to be a monopoly. "Today it is almost impossible to get a precise statement of what constitutes a violation of Section II of the Sherman Act," he said.

Any solution determined by the subcommittee or the courts must establish "very clear criteria of concentration and/or monopolization," McGurk contended. He suggested such criteria be based on market share.

"What we need to understand is that the danger of monopoly is holding

market power rather than something vague like 'attempt to monopolize.'"

As an alternative to government regulation, he suggested industries be given the incentive to restructure themselves.

Dubbing his proposal "restructuring tax credit," McGurk explained that a publicly held company which divests itself of a subsidiary completely would be permitted to take a credit against income tax for the following 10 years.

He further suggested that the cost of such a program could be covered by a graduated income tax for corporations.

McGurk urged the committee members to establish certain criteria for the design of any final solution. In his view, any solution must:

- Break the market power of IBM in such a way that neither computer users nor competitors attempting to supply alternative products are harmed.
- Make competing systems interchangeable.

- Allow no company to dominate technological advancement by surprise announcements of new interfaces between various pieces of hardware and between hardware and software.

- Encourage the entry of new firms into the marketplace.

More exacting in its specifications, Control Data Corp.'s plan to provide "structural relief for the computer industry" is designed "to increase competition without substantial cost to the economy as a whole."

Presented by Hugh P. Donaghue, assistant to the chairman of the board of CDC, this approach is intended "to lessen IBM's monopoly power in the general computer market by a combination of structural relief and injunctions prohibiting IBM's monopolistic practices in that market."

Instead of specifically restructuring the computer systems business, the plan "looks to containment to prevent the

spread of IBM's monopoly power into related growth industries," Donaghue said.

He noted CDC's suggestions involve limited divestiture and divorcement of related activities.

Recommending that the following proposals be implemented together, Donaghue urged the government to:

- Divest IBM of its Components Division and prohibit the company from reentering the business of manufacturing semiconductors and other components.
- Divorce IBM from manufacturing and marketing remote terminals and communications-oriented equipment, including data preparation equipment applicable to remote terminals.
- Prevent IBM from providing professional services and education/training, beyond that directly required by computer sales.
- Divest Science Research Associates.
- Remove the Office Products Division from IBM.

Committee Told IBM Monopoly Spreading

(Continued from Page 29)

Sanders warned.

Carlson suggested price control and the use of such technological ploys as the manipulation of interfaces may be used to promote IBM's dominance in domestic satellite communications.

In addition, as components become increasingly important in the design of computer memory, the semiconductor industry is generally predicted by analysts to be one of growth at least through 1978, Carlson commented. "And now that IBM has MOS technology perfected, it is apparently gaining a technological lead over the semiconductor industry for the first time," she said.

"We know from papers delivered to professional meetings that IBM has the capability of building a single 4K MOS device and that it has had some limited success with a 32K MOS device on a single chip," she noted. Carlson added that the semiconductor industry is presently in the early stages of producing the 4K chips so that yields of chips per wafer continue to be low.

Further, "IBM does not have the same cost requirements as do the semiconductor companies because its profits are derived at the system level and components do not necessarily have to be profitable items when they are first used."

In addition, Carlson noted IBM's capital advantages have permitted extensive research and development activities in the components area.

Expenditure on Components

"We suspect that IBM has spent more than \$73 million on components and would not be surprised if that figure was closer to \$100 million, or three times the amount spent by the other semiconductor manufacturers for improving computer products," she said.

In view of the fact that IBM is moving from a follower to a leader in semiconductor technology, Carlson argued the company's semiconductor "must be available to the other computer companies in order to assure future competition."

She suggested that any restructuring of the industry include the divestiture from IBM of the Components Division and the Semiconductor Test Equipment Division in order to preserve competition.

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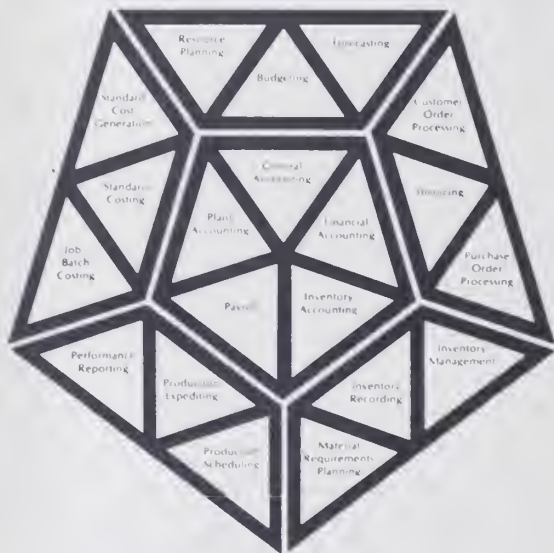
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MARTIN MARIETTA

To Compete With IBM

Japanese Groups Announce New Series

TOKYO — Two Japanese groups have announced new computer series which they hope will compete with IBM and other foreign mainframe manufacturers after the scheduled de-control next year of computer imports and foreign investment in the industry here.

The two groups — NEC-Toshiba (Nippon Electric Co. and Tokyo Shibaura Electric) and Mitsubishi-Oki (Mitsubishi Electric and Oki Electric) — developed their new units under subsidies from the Ministry of

International Trade and Industry (Miti).

Mitsubishi-Oki announced Model 700 of the Cosmo Series, while NEC-Toshiba unveiled the systems 200, 300 and 400 of the Acos Series 77.

Both announcements emphasized software rather than hardware, according to *EDP/Japan Report* (EDP/JR), including multiprogramming, on-line/data base management capability and the availability of high-level languages.

The Cosmo Series Model 700 is

designed to compete with the IBM 370/145 and will handle data base applications in local and remote batch processing, on-line transaction processing and time-sharing modes, according to EDP/JR.

On-line multiprocessing is also available along with three levels of communication control systems.

Factory shipments of the 700 will begin in December with annual production planned for about 20 units.

The systems 200, 300 and 400 of the NEC-Toshiba Acos Series 77 are equivalent to the IBM 370/115, 125 and 135, respectively. Systems 500, 600, 700, 800 and 900 will be added at a later date to complete the family, the newsletter said.

System 200 offers multiprogramming with dynamic memory allocation, communications controllers built into the CPU and 48K to 104K of main memory.

Univac Optimistic on Series 90

FRANKFURT, Germany — Univac has high hopes for overseas sales of the Series 90, and European general manager John Butler expects there will be more Series 90s sold in Europe than in the U.S. in the next five years.

The new 90/30 will be made here in Frankfurt and an order has already been received from Luitpoldhütte, an iron foundry. The German market, with numerous IBM 360/20s, is expected to comprise a large part of the 90/30's sales, according to an article in *Computer Weekly*.

The percentage of computers

in Europe in the 90/30 class being used for on-line processing should grow from 20% to 50% within the next few years, noted European marketing manager Des Pitcher.

In the UK, the ICL 9200 and 9300 installations are an "obvious market," according to Bill Read, UK managing director.

Univac Gaining Ground

Univac is expected to grab the number three slot behind IBM and ICL in terms of European computer sales, according to analysts.

This would put Univac, whose position in the European market was somewhat slim as recently as 1967, ahead of Burroughs, Honeywell and Siemens.

During the year ended March 31, Univac's European computer sales climbed 25% to about \$350 million, and a 33% rise is expected this year, according to an article in the *Wall Street Journal*.

In other areas, Univac is estimated to hold about a 15% share of South Africa's computer market, set at \$100 million.

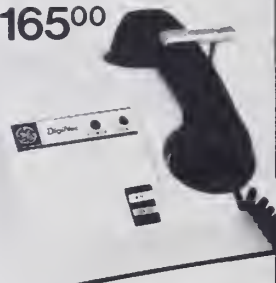
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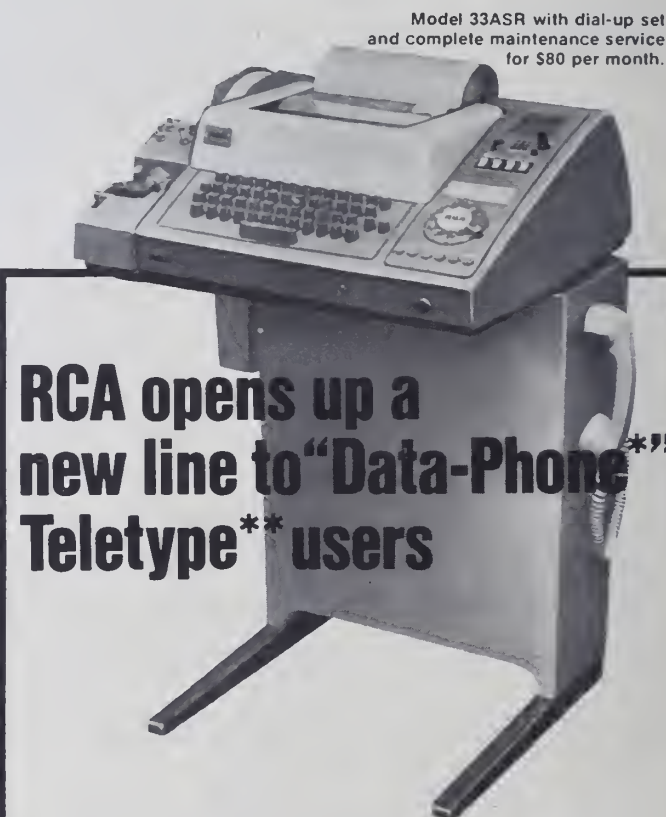
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RCA

Viatron Closer To Liquidation

BOSTON — A bankruptcy court judge here has authorized R. Robert Popeo, trustee of Viatron Corp., to seal the firm's surplus assets and to submit a plan for the company's orderly liquidation to the Securities and Exchange Commission (SEC).

Portidat Corp. of Waltham, Mass., is now acting as the exclusive manufacturing and sales agent for Viatron's System 21, according to Jeffrey Wiesen, counsel to the trustee. Wiesen noted that Viatron retains rights to the technology, but declined to predict if Portidat will buy these rights.

The liquidation plan "expressly provides that there will be no payment for trade creditors and debentureholders," Wiesen noted.

Creditors with secured claims and administrative expenses get first priority for 100% payment, followed by U.S. Government claims, some wage claims and state and local government claims, Wiesen said.

Claims against the company are estimated at \$20 million, perhaps \$15 million of which involve the debentureholders.

The SEC is expected to report back on the trustee's plan by Sept. 16, Wiesen said.

Tariff Disputed

PALO ALTO, Calif. — Representatives of the Western Electronics Manufacturers Association (Wema) have protested a proposed change in the U.S. Tariff Schedules which would bring them in conformity with the Brussels Nomenclature.

The change would mean that ceramic packages for integrated circuits, currently imported as semiconductor parts at a duty rate of 6%, would be classified as "ceramic electrical ware" on which duty is 15%.

This potential increase in duty would be contrary to a presidential directive that the conversion be accomplished with no changes in rates of duty on individual products whenever practicable, Theodore W. Vian, a member of Wema's International Committee, said at a regional hearing of the U.S. Tariff Commission.

Wema requested that the commission spell out specific language in the conversion which would continue to include ceramic packages for semiconductors under their present classification as semiconductor parts.

Executive Corner

■ Ben Taniguchi has become vice-president of national sales for Dataproducts Corp.

■ Laszlo L. Rakoczi has been elected a corporate vice-president of Tymshare, Inc.

■ Harris Communication Systems has appointed Thomas E. Brimer vice-president of marketing.

■ J.L. Ipsen has been promoted to vice-president, components, of Fabri-Tek, Inc.

■ W. Joe Watson has joined General Automation, Inc. as vice-president for research and development.

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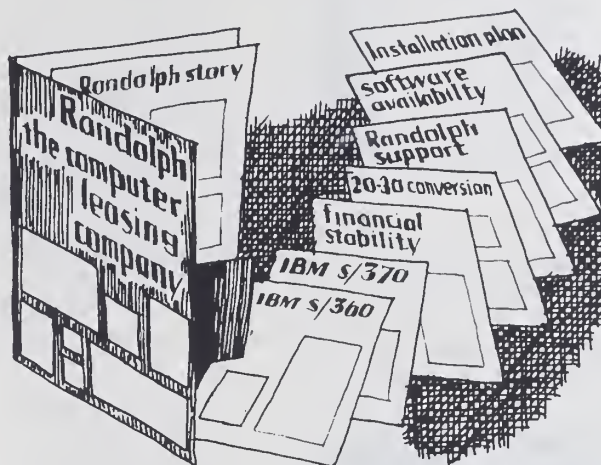
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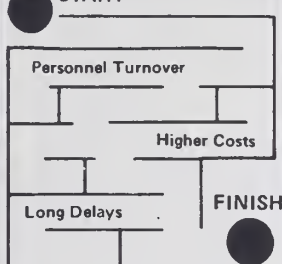
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CMC Profits Double in Second Quarter

MARINA DEL RAY, Calif. — Computer Machinery Corp.'s (CMC) second-quarter earnings continued an upward trend. Revenues reached a record \$15.2 million and earnings both for the quarter and half year doubled over those of the year-ago period.

In the quarter, revenues rose 30% above the \$11.7 million in the year-ago period, while earnings jumped to \$836,000 or 16 cents a share from \$386,000 or 8 cents a share in the same 1973 quarter.

The figures include a tax credit of \$225,000 in the 1974 period and \$219,000 in the 1973 period.

For the six months, the key-to-disk maker, which recently acquired Remcom's product line, earned \$1.8 million or 34 cents a share compared with \$728,000 or 15 cents a share in the year-ago period. Special credits were \$476,000 in 1974 and \$473,000 in 1973.

Revenues for the half year rose to \$29.2 million from \$22.4 million in the year-ago period.

The Remcom acquisition, com-

pleted in June, had little impact on second-quarter operations but will have a positive effect on future earnings, beginning in the third quarter, President Thomas L. Ringer said.

The second-quarter gains were achieved despite an interest expense that was 2 cents a share higher than in the first quarter. A program to extend equipment leases to three- and five-year commitments cut second-quarter earnings by 2.5 cents a share, but will result in increased borrowing capacity, Ringer added.

For the year ended December 1973, CMC's revenues reached \$52.8 million from the year-ago

level of \$29.6 million, while earnings rose to \$3 million or 60 cents a share compared with a loss of nearly \$2 million or 40 cents a share in 1972.

Ringer said he is optimistic about the company's outlook even after taking into account uncertainties in the world economy stemming from high interest rates, tight money and inflation.

He based his optimism on the firm's broadened product line, a \$19 million "if sold" value of order backlog and continued growth in the shared processor, data entry and remote job terminal markets.

Sperry Earnings Rise 13%

NEW YORK — Sperry Rand Corp.'s earnings for the first quarter rose 13% on an 18% increase in revenues.

First-quarter bookings at Univac were a record for any quarter, with orders for computer systems and related products up substantially in markets both here and abroad.

Corporate earnings for the period ended June 30 reached \$26.6 million or 77 cents a share compared with \$23.5 million or 68 cents a share in the year-ago period.

Revenues jumped to \$709.7 million from \$602 million.

J. Paul Lyet, chairman, said the firm is "cautiously confident about the remainder of the year." He noted, however, that "it is increasingly difficult to maintain profit margins in the face of inflation. We are working to improve productivity and asset management in view of inflationary pressures."

Order rates in nearly all divisions continued high and overall backlog at June 30 was a record \$1.8 billion, up 18% from a year earlier, the firm said.

Wang 2200 Sales Boost Record Net

TEWSKURY, Mass. — Sales of the Wang 2200 calculator-computer line contributed in large part to record earnings and revenues at Wang Laboratories, Inc. for the year ended June 30.

Earnings rose 48% to \$4.8 million or \$1.18 a share compared with \$3.3 million or 82 cents a share in the same 1973 period.

Revenues reached \$63.5 million from \$47.7 million last year, a 33% gain.

Results improved this year despite the energy crisis, which put a dent in third-quarter calculator sales to auto dealers, higher interest rates on increased debt and a \$400,000 loss currency exchange, the firm said.

Wang said it has sold around 2,300 of its 2200 line since June 1973.

The firm's Computer Services Division took over the computer operations of eight auto parts warehouses from Westinghouse Electric Corp.'s Tele-Computer Systems Corp. on July 1.

Infonet Profits Spur CSC Gain

EL SEGUNDO, Calif. — Computer Sciences Corp.'s (CSC) Infonet contributed to the three-fold growth in earnings of CSC during the first quarter.

Earnings soared to \$585,000 or 4 cents a share from \$181,000

or 1 cent a share in the year-ago period.

Revenues climbed 18% to a record \$39.7 million compared with \$33.8 million last year.

Network the Key

The major factor in improvement is the continued growth and profitability of Infonet, CSC's remote DP network, chairman William R. Hoover said.

Infonet's quarterly operating income, before corporate charges, was \$1.2 million compared with \$178,000 last year.

Revenues from the service totaled \$7.5 million, a 45% increase over the \$5.2 million posted in the first quarter of last year.

"Overall, the strong growth in corporate revenues and earnings results from continuing demand for CSC's services from a broad range of commercial and federal customers," Hoover said.

Acquisitions

Boeing Computer Services, Inc. has acquired The Leader Corp., New Mexico, which specializes in DP for banks. William A. Dunn, founder and president of Leader, will continue as president and chief executive officer.

Multiple Access Ltd. has acquired a controlling interest in TCC, Inc. through the purchase of TCC stockholdings of Tracor, Inc. and Bresnahan Computer Corp. Multiple Access also purchased and exercised warrants to

purchase TCC common stock held by American National Insurance Co.

MCI Communications Corp. has obtained 52% of N-Triple-C common stock through swap transactions with a limited number of N-Triple-C holders. Both firms provide private-line microwave communications services.

ACTS Computing Corp., a subsidiary of Lear Siegler, Inc., has acquired Methods Science, Inc. as a division of ACTS.

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Three Months Ended May 31		
	1974	1973
Shr Ernd	\$.03
Revenue	2,321,863	\$1,224,872
Tax Cred	19,900
Earnings	41,844	(20,815)

a-Tax-loss carryforward credit.

APPLIED DIGITAL DATA SYSTEMS		
Six Months Ended May 31		
	1974	1973
Shr Ernd	\$.32	\$.06
Revenue	4,007,317	1,364,911
Tax Cred	663,000	108,000
Earnings	1,221,472	202,561

PROGRAMMED & REMOTE SYSTEMS		
Year Ended April 30		
	a1974	1973
Shr Ernd	\$.36	\$.34
Revenue	2,174,700	2,808,795
Earnings	144,900	137,680

a-Preliminary.

GRANITE MANAGEMENT		
Three Months Ended May 31		
	1974	a1973
Shr Ernd	\$.01
Revenue	\$4,276,000	5,630,000
Tax Cred	13,000
Earnings	(567,000)	27,000

a-Restated.

BURROUGHS		
Three Months Ended June 30		
	1974	1973
Shr Ernd	\$.87	\$.68
Revenue	379,039,000	314,319,000
Earnings	33,930,000	a26,161,000
6 Mo Shr	1.42	1.17
Revenue	701,836,000	588,754,000
Earnings	55,306,000	a44,932,000

a-Includes gains from sale of securities of \$50,000 in three months and \$2.5 million in six months.

ADVANCED MEMORY SYSTEMS		
Three Months Ended June 30		
	1974	1973
Revenue	\$8,391,900	\$8,364,900
Loss	111,600	649,200
9 Mo Shr	.02
Revenue	24,825,000	23,154,500
Spec Cred	14,500	42,200
Earnings	30,200	(250,500)

AMERICAN MICROSYSTEMS		
Three Months Ended June 29		
	1974	1973
Shr Ernd	\$.55	a\$.54
Revenue	20,174,000	13,452,000
Earnings	1,230,000	a1,189,000
6 Mo Shr	1.25	a.86
Revenue	39,274,000	25,507,000
Earnings	2,787,000	a1,901,000

a-Restated.

OPTICAL SCANNING		
Three Months Ended March 31		
	1974	1973
Shr Ernd	\$.64
Revenue	4,781,912	\$3,610,681
Earnings	424,098	(76,417)
9 Mo Shr	.87
Revenue	14,158,080	10,386,620
Earnings	574,245	(226,273)

INFORMATION INTERNATIONAL		
Year Ended April 30		
	1974	1973
Shr Ernd	\$.53	\$.35
Revenue	9,280,058	6,854,144
Spec Cred	a291,500	b537,389
Earnings	1,344,000	903,124

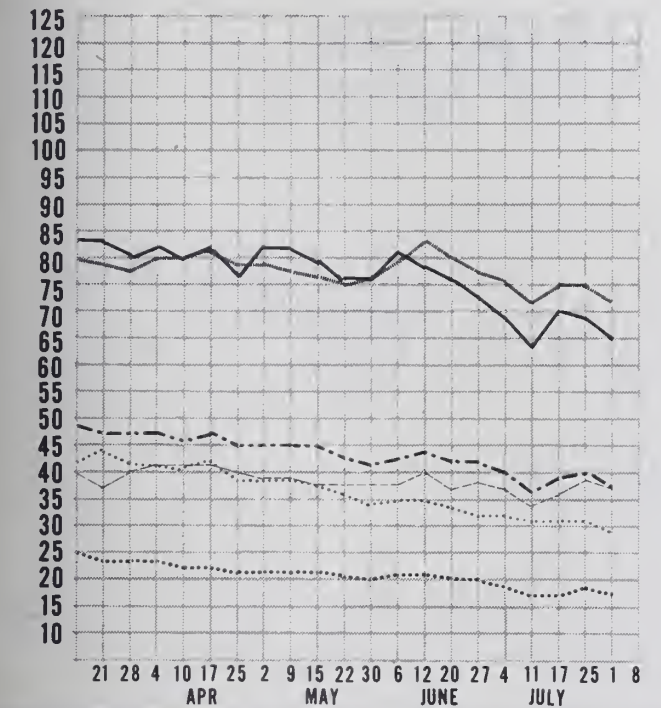
a-From tax credit. b-From tax credit and gain on sale of equipment.

NATIONAL SEMICONDUCTOR		
Year Ended May 31		
	1974	1973
Shr Ernd	\$1.32	a\$.32
Revenue	213,398,000	99,028,000
Earnings	16,372,000	3,719,000
3 Mo Shr	.41	a.16
Revenue	6,379,000	32,256,000
Earnings	5,165,000	1,455,000

a-Adjusted for a three-for-one stock split in December 1973.

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		PRICE						PRICE						PRICE			
E	X	1973-74	CLOSE	WEEK	WEEK	F	X	1973-74	CLOSE	WEEK	WEEK	F	X	1973-74	CLOSE	WEEK	WEEK
C	H	RANGE	JUL 31	NET	RCT	C	H	RANGE	JUL 31	NET	PCT	C	H	RANGE	JUL 31	NET	PCT
		(1)	1974	CHNGE	CHNGE			(1)	1974	CHNGE	CHNGE			(1)	1974	CHNGE	CHNGE
COMPUTER SYSTEMS																	
N	BURROUGHS CORP	49-126	90	-5 3/4	-5.6	O	ADVANCED COMP TECH	1- 2	1	0	0.0	O	COMPUTER COMMUN.	1- 4	1/2	0	0.0
N	COLLINS RADIO	16-26	24 3/4	0	0.0	A	APPLIED DATA RES.	2- 4	1 3/4	- 1/8	-6.6	A	COMPUTER EQUIPMENT	1- 3	1 1/4	- 1/4	-9.0
O	COMPUTER AUTOMATION	5- 20	10 5/8	-1 3/8	-11.4	O	APPLIED LOGIC	1- 3	1/8	0	0.0	O	COMPUTER MACHINERY	2- 13	3 1/8	- 1/2	-13.7
N	CONTROL DATA CORP	20- 62	20 1/4	-3 1/2	-14.7	N	AUTOMATIC DATA PROC	21- 94	25 7/8	-1 3/8	-5.0	O	COMPUTER TRANSCIPHER	1- 6	1	- 1/8	-11.1
N	DATA GENERAL CORP	23- 40	23	-3 7/8	-14.4	O	ARANSON APPLIED SYST	1- 1	3/8	- 1/8	-25.0	N	COMTRAC CORP	13- 32	14 1/8	+ 1/2	+3.6
O	DATAPoint CORP	9- 21	9 1/2	-1 1/4	-11.6	O	CENTRAL DATA SYSTEMS	3- 9	4 1/4	0	0.0	O	DATA ACCESS SYSTEMS	1- 3	2 1/2	0	0.0
O	DIGITAL COMP CONTROL	2- 6	2 1/4	0	0.0	O	COMPUTER DIMENSIONS	1- 5	1 1/2	0	0.0	O	DATA 100	7- 19	8 5/8	- 3/8	-4.1
N	DIGITAL EQUIPMENT	73-121	88 1/8	-7	-7.3	O	COMPUTER HORIZONS	1- 6	1 1/2	0	0.0	A	DATA PRODUCTS CORP	2- 5	3 1/2	0	0.0
N	ELECTRONIC ASSOC.	2- 9	1 7/8	- 1/8	-6.2	O	COMPUTER NETWORK	1- 5	1 1/4	+ 1/8	+11.1	O	DATA RECOGNITION	1- 3	1/4	0	0.0
A	ELECTRONIC ENGINEER.	6- 14	7 3/4	- 1/4	-1.5	N	COMPUTER SCIENCES	2- 6	2 5/8	- 1/8	-4.5	O	DATA TECHNOLOGY	1- 5	2 1/2	- 1/2	-16.6
N	EXXARO	23- 48	26 1/2	-1 3/4	-6.1	O	COMPUTER TASK GROUP	1- 2	1/2	0	0.0	O	DECISION DATA COMPUT	4- 40	5 3/4	- 5/8	-9.8
O	GENERAL AUTOMATION	22- 55	26 1/4	-4 1/2	-14.6	O	COMPUTER TECHNOLOGY	1- 3	1/2	0	0.0	O	DELTA DATA SYSTEMS	1- 1	5/8	0	0.0
O	GRI COMPUTER CORP	1- 3	3 5/8	0	0.0	O	COMPUTER USAGE	2- 9	2 5/8	- 1/4	-8.6	O	DIANAL CONTROLS	1- 4	1/2	0	0.0
N	HONEYWELL INC	70- 99	73 5/8	-6 1/2	-8.1	O	COMPRESS	1- 2	3/8	0	0.0	N	ELECTRONIC M & M	2- 6	2 1/2	0	0.0
N	IBM	37-139	39 1/4	+ 1/2	+1.2	O	COMSHARE	2- 9	2 1/2	- 1/4	-9.0	O	EMERIT-TEK	2- 5	1 3/4	- 1/8	-6.6
O	INTERDATA INC	198-340	201 5/8	-13 1/8	-6.1	N	COMSHARE CORP	2- 15	2 3/8	0	0.0	O	GENERAL COMPUTER SYS	2- 9	1 3/4	- 1/4	-12.5
O	MICRODATA CORP	7- 22	19 1/4	+ 1/4	+1.3	A	CORATAR	1- 4	1 3/4	+ 1/8	+7.6	N	GENERAL ELECTRIC	43- 76	43	-5 3/8	-11.1
O	NCR	2- 10	4 1/8	+ 1/8	+3.1	A	ELECT COMP PROG	1- 2	1/4	0	0.0	N	HAZELTINE CORP	4- 9	4 1/8	- 1/8	-2.9
N	RAYTHEON CO	22- 39	27	-4 3/8	-13.9	O	ELECTRONIC DATA SYS.	12- 56	18 1/8	+ 1/2	+2.8	O	INFOPEX INC	2- 23	2 3/4	- 1/2	-15.3
						O	INFORMATIONAL INC	1- 2	1/2	0	0.0						
N	SINGER CO	24- 74	24 1/2	-2 1/4	-8.4	O	I.O.A. DATA CORP	1- 1	3/8	0	0.0	O	INFORMATION DISPLAYS	1- 2	1/8	0	0.0
N	SRRP PAND	33- 56	33 1/8	-3 1/8	-8.6	O	IRS COMPUTER MARKET	1- 5	3/4	0	0.0	O	INFORMATION INTL INC	8- 15	9	- 1/4	-2.7
A	SYSTEMS ENG. LARS	1- 8	1 5/8	0	0.0	O	KEANE ASSOCIATES	2- 5	2 3/4	0	0.0	A	LUNDA ELECTRONICS	3- 9	2 7/8	0	0.0
N	TEXAS INSTRUMENTS	83-138	82 5/8	-1 3/4	-2.0	O	KEYDATA CORP	2- 12	2 1/2	0	0.0	O	MANAGEMENT ASSIST	1- 1	1/8	0	0.0
O	ULTIMAC SYSTEMS INC	1- 11	1 3/4	+ 1/4	+16.6	O	LOGICON	2- 7	3 3/8	0	0.0	N	MEMOREX	2- 19	3 3/4	- 1/8	-3.2
N	VARIAN ASSOCIATES	7- 20	7 5/8	- 5/8	-7.5	A	MANAGEMENT DATA	1- 5	1 3/8	0	0.0	A	MILGO ELECTRONICS	9- 28	10	- 7/8	-8.0
N	WANG LABS.	10- 34	10 1/2	- 1/2	-4.5	O	NATIONAL CSS INC	12- 42	11 1/2	-5 1/2	-32.3	N	MORAWK DATA SCI	2- 13	2 1/4	- 1/8	-5.2
N	XEROX CORP	94-169	94 3/8	-10 7/8	-10.3	O	NATIONAL COMPUTER CO	1- 1	1/4	0	0.0	O	ORAC COMPUTER SYST.	2- 8	1 1/2	0	0.0
						O	NATIONAL INFO SVCS	1- 2	1/4	0	0.0	O	OPTICAL SCANNING	2- 8	3	0	0.0
LEASING COMPANIES																	
A	BONITE COMPUTER	1- 5	1 1/4	0	0.0	A	ON LINE SYSTEMS INC	12- 31	23 1/2	-1 1/2	-6.0	O	REFLECT CORR	1- 8	2 3/4	0	0.0
O	BRESNAHAN CORP.	1- 2	2 1/4	0	0.0	N	PLANNING RESEARCH	2- 7	2 1/4	- 3/8	-14.2	O	PHOTON	1- 7	3 3/4	0	0.0
O	COMISCO INC	2- 17	2 3/4	- 1/8	-4.3	O	PROGRAMMING METHODS	17- 25	17	0	0.0	A	PORTED INSTRUMENT	2- 9	2 3/8	0	0.0
A	COMMERCE GROUP CORP	3- 6	3	0	0.0	O	PROGRAMMING & SYS	1- 1	3/4	0	0.0	O	PRECISION INST.	2- 6	3/4	- 1/2	-40.0
O	COMPUTER EXCHANGE	1- 1	1/8	0	0.0	O	RAPIDATA INC	2- 24	2 1/4	0	0.0	O	QUANTOP CORR	3- 10	3 1/4	- 1/2	-13.3
A	COMPUTER INVESTS GRP	1- 8	1 1/4	- 1/4	-16.6	O	SCIENTIFIC COMPUTERS	1- 3	7/8	0	0.0	O	RECOGNITION EQUIP	1- 8	2 1/2	- 1/4	-9.0
O	COMP. INSTALLATIONS	1- 2	1/4	- 3/4	-75.0	O	SIMPLICITY COMPUTER	1- 4	1 1/8	0	0.0	N	SANOFUS ASSOCIATES	3- 18	3 5/8	- 1/8	-3.3
M	DATRONIC RENTAL	1- 3	3/4	0	0.0	O	TCC INC	1- 1	1/2	0	0.0	O	SCAN DATA	1- 6	1 1/8	0	0.0
O	DCL INC	0- 3	3/8	0	0.0	O	TYMSHARE INC	6- 13	9	- 1/2	-5.2	O	STORAGE TECHNOLOGY	9- 34	9 5/8	-1 1/8	-10.4
N	DPE INC	3- 9	2 5/8	- 3/8	-12.5	A	UNITED DATA CENTER	2- 6	2	0	0.0	O	SYCOR INC	7- 20	7 1/2	- 3/4	-9.0
O	FOR RESOURCES	1- 3	3 1/4	0	0.0	A	UPS SYSTEMS	2- 8	1 7/8	- 1/8	-6.2	O	TALLY CORP.	2- 14	2	- 1/8	-5.6
A	GRANITE MGT	1- 6	2	+ 1/8	+6.6	N	WYLY CORP	3- 11	2 5/8	- 1/4	-8.6						
A	GREYHOUND COMPUTFF	3- 6	3 3/8	+ 1/8	+3.8							O	TFC INC	4- 9	3 1/2	- 1/4	-6.6
A	ITFL	4- 12	4 1/8	- 3/8	-8.3							N	TEKTRONIX INC	29- 55	28 1/2	-4 1/2	-13.6
N	LEASCO CORP	7- 18	6 5/8	- 1/8	-1.8							N	TELEX	3- 8	2 5/8	- 1/4	-8.6
O	LASPAC CORP	1- 8	3/4	- 1/8	-14.2							O	WANGCO INC	7- 13	7 7/8	- 5/8	-7.3
O	LECTRA MGT INC	1- 2	1/4	0	0.0							O	WILTEK INC	3- 18	3 1/4	- 1/4	-7.1
O	MDG INC	2- 15	2 1/4	- 1/8	-5.2												
A	PIONEER TEX CORR	2- 10	2 3/4	+ 1/4	+10.0												
A	ROCKWELL COMPUTE	1- 3	3/4	+	+8.3												
N	U.S. LEASING	10- 36	9 5/8	-1 1/8	-10.4												
PERIPHERALS & SUBSYSTEMS																	
						N	ADDRESSGRAPH-MULT	5- 34	5 1/2	- 3/8	-6.3	O	BALTIMORE BUS FORMS	4- 9	4 3/4	- 1/4	-5.0
						O	ADVANCED MEMORY SYS	3- 23	2 1/2	- 1/8	-4.7	A	BARRY WRIGHT	5- 13	5 1/4	0	0.0
						N	AMREX CORP	3- 7	3 3/8	+ 3/8	+12.5	O	CYBERNETICS INC	1- 3	1 1/8	- 1/4	-10.0
						O	ANDERSON JACOBSON	2- 6	2	- 1/4	-11.1	A	DATA DOCUMENTS	17- 54	38	-6 3/8	-14.3
						O	BEHIVE MEDICAL FLEC	3- 10	2 1/2	0	0.0	O	DUPLEX PRODUCTS INC	6- 17	12 5/8	-1 1/8	-8.1
						A	BOLT-PERANEK & NEW	6- 12	6 7/8	- 1/2	-6.7	N	ENNIS BUS. FORMS	5- 8	5 5/8	- 3/8	-6.2
						N	BUNKEG-RAMO	5- 18	5 1/8	- 1/8	-2.3	O	GRAPHIC MAGNETICS	6- 20	7 1/2	-1	-11.7
						A	CALCOMP	5- 16	7 1/2	-1 1/8	-13.0	O	GRAPHIC CONTROLS	7- 12	9 1/4	+ 1/4	+2.7
						O	CAMBRIDGE MEMORIES	7- 17	8 3/4	+ 1/8	+1.4	N	3M COMPANY	65- 91	65	-3 3/8	-4.9
						O	CENTRONICS DATA COMP	12- 38	12 1/2	-1 3/4	-12.2	O	MOORE CORP LTD	48- 65	51 1/4	- 1/2	-0.9
						O	CODEX CORP	8- 19	12	+ 3/4	+6.6	N	NASHUA CORP	32- 58	35 1/2	-1 1/4	-3.4
						O	COGNITRONICS	1- 3	7/8	0	0.0	O	PFYNNOLDS & REYNOLD	12- 51	13	+1	+8.3
												O	STANDARD REGISTER	11- 20	13 1/2	- 1/2	-3.5
												O	TAR PRODUCTS CO	6- 23	5 3/4	0	0.0
												N	UJARCO	15- 23	19 1/2	+ 1/4	+1.2
												A	WARASH MAGNETICS	5- 8	5	+ 1/4	+5.2
												N	WALLACE BUS FORMS	14- 26	18 1/8	- 7/8	-6.6
SUPPLIES & ACCESSORIES																	

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